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COMPUTERWORLD

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Democrats find that computers, politics do mix

ELECTION '84

By Jeffry Beeler
CW West Coast Bureau

SAN FRANCISCO — Last week's 1984 Democratic National Convention set several noteworthy precedents, both political and technological.

While convention delegates were busy nominating their first woman vice-presidential candidate, the Democrats were also reportedly setting a record for the largest assemblage of computer gear in the history of American political gatherings.

Included in the Democrats' high-tech arsenal, much of which was donated, were some 500 workstations, seven minicomputers, an armada of disk systems with a combined storage capacity of 1G byte and seven communications networks. Three of the networks were strictly local, while the other four were of the long-line variety, connecting convention sites to installations as far away as Democratic National Committee headquarters in Washington, D.C.

Estimates of the electronic aids' combined value range from $1 million to $1.25 million, according to Tim Sammons, the convention's official systems consultant and head of Sammons & Associates, Inc., in nearby Berkeley, Calif.

Spearheading the Democrats' first serious foray into high-tech conventioneering were five communications-oriented facilities:

- A credentials and data security network from Sytek, Inc.
- An electronic mail system created by American Network Services, Inc.
- A vote tabulation network supplied by Datapoint Corp. and Pacific Bell Telephone Co.
- A phone message distribution system jointly developed by Pacific Bell, Lanier Business Products, Inc. and Chronicle Videotex, Inc.
- A videotex service, also provided by Chronicle, for dispensing information about both the convention and points of local interest.

Last week's Democratic extravaganza marked the first time in U.S. history that such automated services have found their way into a national political convention, according to sources.

Consider, for example, the indispensable matter of delegate vote-taking. In the past, delegates to national conventions — both Democratic and Republican — indicated their votes on paper ballots, which were then collected by pages and hand delivered for official counting and tabulation. Because the process was largely manual, just one vote frequently took as long as an hour and a half to complete, according to Charles McCoy, vice-president of

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TOP OF THE NEWS

Shall we bill you later? A committee of telecommunications users is saying that private-line users may be overbilled millions of dollars — unless the Federal Communications Commission steps in. **Page 2.**

■

Leading-edge proceedings. Last week's Democratic National Convention was the most fully computerized in history, with everyone from pollsters to reporters to campaign trench workers utilizing a myriad of data bases and systems to keep abreast of the action. **Pages 4-5.**

■

Success on a shoestring budget. A county government DP chief dug into very shallow pockets to put together his slick operation and cut staff turnover down to nothing. **Page 6.**

■

Star wars. Federal agents raided homes in Alabama to seize micros allegedly used to access unclassified data bases at a National Aeronautics Space Administration flight center. **Page 11.**

■

You learn a lot after 30 years in the business. Applied Data Research, Inc.'s President Martin Goetz shared his reflections and predictions in an interview with *Computerworld*. **Pages 12-13.**

■

Order emerging from chaos. The frenetic 32-bit supermini market appears to be maturing, as vendors begin targeting offerings to vertical markets. **Page 53.**

■

Reshuffling the deck. Hewlett-Packard Co. reorganizes its top management offices in an effort to become more market- and less product-based. **Page 67.**

■

DEC launches high-end micro in PDP-11 line

By Eric Bender
CW Staff

MAYNARD, Mass. — Digital Equipment Corp. last week added a top-of-the-line model to its line of Micro PDP-11 multiuser microcomputer systems — the Micro PDP-11/73, which reportedly offers performance three to five times greater than that of the first Micro PDP-11.

Analysts applauded the introduction, noting that the system overcomes the performance limitations of the original Micro PDP-11 and can run the tremendous body of PDP-11 software available.

The Micro PDP-11/73's 16-bit J-11 chip set, operating at 15 MHz, is "a fantastic improvement on the original chip," said Peter Lowber of the Yankee Group in Boston. "This is the chip people are waiting for."

The new micro is "a very significant introduction," said Steven Smith of Paine Webber Mitchell Hutchins in New York. "It will be very competitive with systems based on processors such as the Motorola, Inc. MC68000. The technical gap has been closed."

The system is compatible with the 200,000 PDP-11 computers in use worldwide, according to DEC. "The availability of more than 2,000 indexed application programs that run on PDP-11s expands the potential for microcomputer users through the Micro PDP-11/73," said DEC product manager Daryl Long. "Most of these application programs can run with little or no modification on the new system."

Ten operating systems will be offered for the Micro PDP-11/73: Micro RSX, RSX-11M, RSX-11S, RSX-11M-Plus, Micro/RSTS, RSTS/E, RT-11, Ultrix-11 (a 16-bit

See **DEC** page 2

Insurer finds its missing link

FIRST USER

By Paul Korzeniowski
CW Staff

NEW YORK — Metropolitan Life Insurance Co. found the missing piece to its microcomputer-to-mainframe puzzle: a formatting package that massages data from a mainframe or microcomputer application so it may be loaded into another package.

Since receiving the Ilink package from Information Software in January, Marcia Hearst, information center manager at Metropolitan's headquarters here, has used an IBM 3270 Personal Computer to download three vendors' Vsam files on Metropolitan Life's IBM 3081 mainframe into various microcomputer applications.

Ilink, announced in April, supports two microcomputer formats, Data Interchange Format and Comma Separated Values. These formats allow a user to load data into a number of packages, including Lotus Development Corp.'s 1-2-3, Visicorp's Visi Calc and Ashton-Tate's Dbase II.

Mainframe applications supported include SAS Institute, Inc.'s SAS; Information Builders, Inc.'s Focus; Execucom Systems Corp.'s FPS; Applied Data Research, Inc.'s ADRS; Mathematica Products Group, Inc.'s Ramis; and IBM's APLDI. Using Ilink, Metropolitan has downloaded files from the latter three into Sorcim Corp.'s Supercalc III and Powerbase Systems, Inc.'s Powerbase.

Metropolitan's downloading exercises were staged to demonstrate Ilink's capabilities to potential users. Earl Alexan-

See **ILINK** page 9

NEWSPAPER

NEWS

Private-line users may be overbilled: Ad hoc group

By Phil Hirsch
CW Washington Bureau

WASHINGTON, D.C. — Private communications line users may be billed incorrectly for millions of dollars in access surcharges, beginning early next month, unless the Federal Communications Commission takes immediate action to stop the overbilling, a committee of telecommunications users said here last week.

James Blaszak, an attorney representing the Ad Hoc Telecommunications Users Committee, said the committee has asked the FCC to let the charges go into effect only if a number of changes are made.

As an example of such a change, Blaszak said users would have to be given 180 days, rather than the 90 days proposed in the tariff, to obtain credits for special access surcharges that were improperly billed.

Besides the Ad Hoc Committee, AT&T and Satellite Business Systems also filed comments and requested this and other similar changes.

According to a spokesman for the National Exchange Carriers Association (Neca), the group which filed the June 25 tariff on behalf of the nation's local telephone companies, the total special access surcharge will amount to about $20 million/mo. According to figures supplied by the FCC, private-line revenues for the first four months of this year averaged $258 million/mo. Gross revenues, for both private-line and switched services, averaged $2.3 billion/mo.

The special access surcharge — $25/mo for every private-line termination capable of accessing a local exchange network — is included in a tariff Neca submitted to the FCC on June 25. If the commission does not act, the tariff will become effective Aug. 10.

The Ad Hoc committee, in its petition, indicated that errors in assessing private-line charges are inevitable, partly because the commission could not specify all of the individual exemptions. Also, "the current private-line service provisioning problems demonstrate that at least some carrier records are . . . in horrible disarray," the committee added.

The petition stressed that users, incorrectly billed, often would not realize any error, because "implementation of the special access surcharge and its exemptions are not well understood."

Even if the user was aware of an incorrect charge, the committee said that obtaining a credit would be difficult. One reason is the limited, 90-day period allowed for requesting the credit. Also, the committee stated, "it is quite possible that the local exchange carriers will not assign the same numbers to special access lines as AT&T or the other common carriers assign to their [inter-Local Access and Transport Areas (Lata) long-distance] circuits." This, the committee continued, could be "a very serious problem with respect to private lines ordered on an end-to-end basis from an inter-Lata carrier."

To remedy these problems, the committee suggested that the FCC:

■ Require each local carrier to send a notice to each of its interstate customers explaining the special access surcharge and designating a point of contact for exemption requests 30 days before the Neca tariff becomes effective. The explanation would include information on how a user obtains circuit identification numbers.

■ Allow inter-Lata carriers to act as agents for users in requesting exemptions and paying the surcharge. Because the carriers are more familiar with the surcharges, they are in a better position than users to know which applications are exempt, the committee contended.

■ Extend the present 90-day grace period to 180 days.

DEC from page 1

version of AT&T's Unix), CTS-300 and DSM-11. These will be available when the system ships in September, according to a spokesman.

Supports 12 users

The Micro PDP-11/73 supports up to 12 users and features a lower cost per terminal than previous PDP-11 systems, Long said. "For example, a 12-user system using [DEC's] VT220 terminals will have a per-terminal cost of less than $2,400."

A rack-mounted CPU module with 512K bytes of random-access memory (RAM) costs $7,800. A starting system with CPU, dual minifloppy disk drives and a 10M-byte hard disk drive is priced at $15,140. Another system with CPU, 512K bytes of RAM, 26M bytes of fixed storage and 26M bytes of removable-cartridge storage will carry a $19,500 price tag.

The Micro PDP-11/73 accepts Q-bus peripherals, and both a 31M-byte hard disk drive and a 60M-byte streaming-tape cartridge backup system are optional.

The system was "long overdue," commented Brad Smith, associate director for small computer industry services at Dataquest, Inc. in San Jose, Calif.

Smith called the new system "a fantastic product," and estimated that the installed base of PDP-11 software "probably is on the order of $2 billion. That's an incredible software investment, and they'll be able to protect that."

Smith also noted that the system's packaging permits insertion of upgraded CPU, memory and disk products as these are developed during the next three to four years.

Demise of PDP-11?

Like some other analysts, however, Smith predicted that the Micro PDP-11/73 is the end of the road for the PDP-11 computer line. "They'll probably let it die a natural death, and replace it with a 32-bit implementation," he said.

DEC officials denied that suggestion, reaffirming the company's commitment to the PDP-11 series.

The manufacturer also announced reductions in field service costs for existing Micro PDP-11s of 11% to 16% .

DEC is headquartered in Maynard, Mass.

DEC Micro PDP-11/73.

NEWS SUMMARY

The Democratic National Convention: Convention organizers utilized the most sophisticated data security safeguards in the convention's history . . . Television reporters at the convention turned to computers for leads on interviews and background information/**4-5**

David A. France, DP director for Monroe County, N.Y., has put together a distributed network for the county that has won awards for its sleek modernity/**6**

The Executive Commission of the European Economic Community is expected to render a decision this week in the IBM antitrust case/**8**

The National Institute for Occupational Safety and Health will conduct a study into what aspects of modern office work generate the most stress for female clerical workers/**8**

The U.S. Department of Labor has established a computerized national job bank that allows job seekers to reach employers anywhere in the country — without fees/**9**

Organized crime and white-collar thieves are taking advantage of law enforcement agencies unequipped to handle high-tech crime, one expert said/**10**

Federal officials last week raided four Alabama homes and seized computer equipment used to gain illegal access to National Aeronautic and Space Administration research computers/**11**

The Electronic Funds Transfer Association said the future of consumer-oriented electronic funds transfer will be determined in a New York appeals court/**15**

Burroughs Corp., Honeywell, Inc. and NCR Corp. all reported increased quarterly profits, but Apple Computer, Inc. said its quarterly profit was down, despite increased sales/**15**

CW at NCC: The legal issues surrounding software liability and licensing are unclear, experts told an NCC work session/**16**

IBM, in a compromise, will not force its independent dealers to identify third-party purchasers of IBM systems/**16**

An elaborate computer system has been designed to track event results at the Los Angeles Summer Olympics later this month/**17**

IBM reported continued strong fiscal performance in the second quarter and noted a trend toward direct purchases of equipment/**18**

The California State Police headquarters in Sacramento has configured one IBM Personal Computer XT into a multiuser system supporting 14 terminals/**19**

New Jersey lottery players hoping to hit the jackpot earlier this month found that, due to a snag in the lottery's systems, no one knew if they had won/**22**

Competition among firms for computer professionals of all kinds is intense, according to a survey of companies attending the Tech Fair, held in conjunction with the National Computer Conference/**24**

CW at NCC: Workstation users will reap the benefits of increased functionality, while prices remain stable through 1985, Amy Wohl, an analyst, told an NCC session earlier this month . . . James P. McCloskey, a company vice-president, told another session that faster is not necessarily better when it comes to distributing DP information to executives . . . Trends in the electronic mail industry include alternative delivery methods, integration of text with voice and images and the use of personal computers, a session panel said/**24-28**

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NEWS

Fear of data sabotage prompts tight convention security

ELECTION '84

By Jeffry Beeler
CW West Coast Bureau

SAN FRANCISCO — Long before the start of last week's 1984 Democratic National Convention, planners asked themselves a frightening, but unavoidable question: What is the likelihood that saboteurs could breach the convention's data security and seriously interrupt the proceedings?

Without strict safeguards, they concluded to their dismay, the possibilities are mind-boggling and nearly endless.

In the end, their caution prompted the convention organizers to adopt the most elaborate and sophisticated data security safeguards in Democratic National Convention history, according to consultant Tim Sammons, head of Berkeley, Calif.-based Sammons & Associates, Inc.

At the heart of the high-tech security system will be 12 NCR Corp. Model 4 personal computers, each equipped with hard-disk modules that will allow the micros to store credentials information locally.

Some of the IBM-compatible personal computers will be housed in the convention's security headquarters and credentials office. Others will be installed at the Democrats' credentials verification sites, which will be located at the entrances to the convention hall. The rest of the machines will reside at the half-dozen or so locations where credentials are scheduled to be dispensed.

Interconnecting the 12 NCR micros will be a Sytek, Inc. broadband data communications link capable of transmitting at 56K bit/sec. Other major hardware elements in the convention's data security system will include an NCR Tower 1632 minicomputer and a Case/Rixon, Inc. statistical multiplexer, both of which will reside a few blocks away at the convention's administrative headquarters.

The mini will serve as the security system's hub and will maintain a master list of the estimated 28,000 to 30,000 delegates, media representatives and other convention attendees who are authorized to receive credentials.

Together, the mini, the Sytek communications facility and the NCR micros will form a secured local network whose main purpose will be to prevent would-be convention crashers from slipping into the meeting hall without valid credentials.

To minimize the chances of a security breakdown, convention organizers will require all attendees to go in advance to a preassigned distribution point to pick up their credentials. There, the visitors will find a micro and an operator, who will summon the guests' records from the Democrats' on-line credentials file and display the information on the screen.

After checking the attendees' identification and verifying that their names are on file, the operator will provide them with the appropriate credentials, each of which is uniquely numbered. As attendees arrive at the distribution sites, the micro will automatically keep track of which credentials have been released and which have not.

Each completed transaction will first be posted locally on the micro's hard disk and then will be broadcast throughout the local network to the other 11 micros, whose own data bases will be likewise updated. In theory, all 12 machines will have exactly the same list of credentials recipients at all times — a safeguard aimed at preventing duplicate passes from being issued to different individuals at different locations.

If a credential is later reported lost or stolen, an operator will be able to invalidate the appropriate identification number, initiate a networkwide alert and issue a new pass, he added.

As a further security precaution, all data transmissions everywhere in the local network will be automatically encrypted. The absence of data encryption would leave the network vulnerable to the possibility that "someone might tap into our lines, analyze our signals and insert a false message into our data stream," Sammons said.

"Just a little of that kind of tampering could bring the convention to its knees."

THE 1984 DEMOCRATIC NATIONAL CONVENTION SYSTEMS LINEUP AT A GLANCE

Credentials and data security network
- **Location:** 12 nodes scattered among the convention's security center, credentials office, credentials verification points, credentials distribution sites.
- Purpose: To prevent unauthorized access to convention floor and to maintain integrity of Democrats' credentials data base.
- Vendors: Sytek, Inc. (Local Net 20 encrypted networking scheme).
  NCR Corp. (Model 4 personal computers and Tower 1632 minicomputers, used as network controller).
  Case/Rixon, Inc. (statistical multiplexer).

Electronic mail network
- **Location:** 88 nodes scattered among caucus rooms of 57 state delegations, Moscone Center (site of convention floor), local Democratic National Committee headquarters, San Francisco Host Committee office, City Hall, main pressroom.
- Purpose: To distribute critical information rapidly, like last-minute schedule changes or details about upcoming referenda to convention participants in widely dispersed locations.
- Vendors: American Network Services, Inc. (network designer).
  NCR (personal computers and Tower 1632 mini).
  Centronics Data Computer Corp. (printers for network nodes)
  Case/Rixon (statistical multiplexer).
  Protocol Computers, Inc. (protocol converters).
  Lifetree Software, Inc. (word processing software for NCR personal computers).
  Multimate International Corp. (word processing software for NCR personal computers).
  Gandalf Technologies, Inc. (statistical multiplexers, modems).
  Burroughs Corp. (diskette, paper).
  Context Management Systems, Inc. (Context MBA).
  Harvard Software, Inc. (project management programs).
  Hamilton Sorter, Inc. (computer furniture).

Electronic voting system
- **Location:** Floor of convention center.
- Purpose: To capture, count, tabulate and display delegate votes.
- Vendors: Datapoint Corp. (Model 8220 workstations for each state delegation, four 8600 minicomputers serving as workstation controllers, Attached Resource Computer local network).
  Pacific Bell Telephone Co. (coaxial cable).

Telephone messaging center
- **Location:** Two message pickup centers in Moscone Center plus terminals in surrounding hotels.
- Purpose: To allow delegates and other convention participants to retrieve their phone messages electronically.
- Vendors: Lanier Business Products, Inc. (workstations at pickup centers).
  Chronicle Videotex, Inc. (central network processor).
  Pacific Bell (communications lines).

Videotex terminal network
- **Location:** Moscone Center and area hotels.
- Purpose: To provide visitors with access to phone messages, convention background information, details about local tourist spots.
- Vendor: Chronicle Videotex (22 Teleguide terminals).

Lap-size portable computers
- **Location:** Traveling with members of state delegations, San Francisco Host Committee, Democratic National Committee.
- Purpose: To allow users to perform assorted tasks, including communicating with their home offices and gaining access to public information services.
- Vendor: Convergent Technologies, Inc. (donated 100 Workslates to convention).

CONVENE from page 1

Datapoint's custom systems.

This year, however, the Democrats replaced their traditional paper ballots with an electronic voting system incorporating 61 Datapoint workstations that were linked by coaxial cable to form a local network.

To use the network, each of the 57 state delegations on the Democrats' convention floor was supplied with its own Datapoint 8220 workstation. Four other 8220s were also situated a few hundred feet away on the podium of this city's Moscone Center, the convention's main meeting hall.

When time came to conduct a ballot, the 57 delegation chairmen entered their delegates' votes into the workstations, which then transferred the raw input to four nearby Datapoint 8600 CPUs for processing. After the votes were counted and tabulated, the results were displayed on three large video monitors.

Also housed inside the Moscone Center was a telephone message distribution center that consisted of two booths, one located in a hallway leading directly to the convention floor. In essence, the center was an automated equivalent of the Democrats' traditional process.

Under the updated system, a caller who wanted to leave a message for a convention attendee first dialed the phone number for a central answering service situated only about a block from Moscone. There, the caller's message was dictated to a clerk and entered through a terminal into a Digital Equipment Corp. VAX-11/780 housed nearby in Chronicle Videotex's corporate headquarters.

When the intended recipient later left the convention floor and approached either of the two message booths, he found his name and the caller's phone number displayed on one of a small battery of overhead television monitors.

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TV reporters turn to computers for convention leads

Network data bases also used for delegate profiles, report research, scheduling

ELECTION '84

By James Connolly
CW Staff

SAN FRANCISCO — It was not a blind hunt for ABC newsman Sam Donaldson last week as he patrolled the floor of the Moscone Center here in search of Democratic National Convention delegates to comment on speeches and platform planks.

He and other ABC, CBS and NBC reporters had at their disposal data bases filled with details about more than 5,000 delegates, their ethnic backgrounds, their occupations, their incomes, their ages and their political leanings.

The data bases, stored in the networks' mainframe computers 3,000 miles away, were among the numerous ways the television news organizations used computers for convention coverage last week.

Before the convention, ABC polled delegates about their backgrounds and their feelings on issues likely to be raised during platform debates. Amy Finkelstein, computer management supervisor for ABC, said that the data helps producers to steer correspondents to delegates interested in a particular issue.

But the data base also allowed ABC's analysts to examine past and present voting patterns. "They can tell, for example, whether black women are voting in favor of a nuclear freeze, or which way Democratic officeholders are leaning," noted Finkelstein, who said the use of computer technology in convention coverage has not changed greatly in the four years since the 1980 conventions.

"We have been able to provide an estimate of how things are expected to go on a vote, and in each case, we've been within 100 votes of the final total. Also, we've been able to provide the correspondents with the names of delegates who have taken positions, pro or con," she said.

"We have been able to say, 'This one is a schoolteacher from Nebraska who favors the plank,' " added John Miller, manager of data operations for ABC.

Miller said a good response time has been two seconds and that response time has rarely exceeded five seconds.

In ABC's case, approximately 60 IBM 3178 terminals in Moscone Center had dedicated-line access to the network's IBM 3081 mainframes in Hackensack, N.J.

In addition, four IBM Personal Computers in the control room and anchor booth stored blurbs of information about the convention and individual delegates. This information was used by broadcasters throughout the week, Finkelstein said.

CBS personnel used IBM Personal Computers that were linked to their IBM 3033 and 3081 mainframes in New York via dial-up lines and Hayes Microcomputer Products, Inc.'s Smartmodem 1200s.

In addition to drawing information about delegates and voting patterns through mainframe programs written in APL by CBS' programmers, CBS used the IBM Personal Computers to maintain a running tabulation on platform votes and the nomination process.

"As a roll call is in progress, it is necessary to track the running count as it takes place. The reasons are: one, to keep the correspondents aware of it; and two, to present it [physically] to people watching at home," said Richard Silverman, deputy director of CBS' election and survey unit.

The character generator program was downloaded from the mainframes to the Personal Computers, allowing the network to show results on home television screens as the votes took place, Silverman said.

ABC also used its remote terminals as a scheduling tool, providing all personnel with an on-line display of those events and special reports that were scheduled and their expected length, Finkelstein noted.

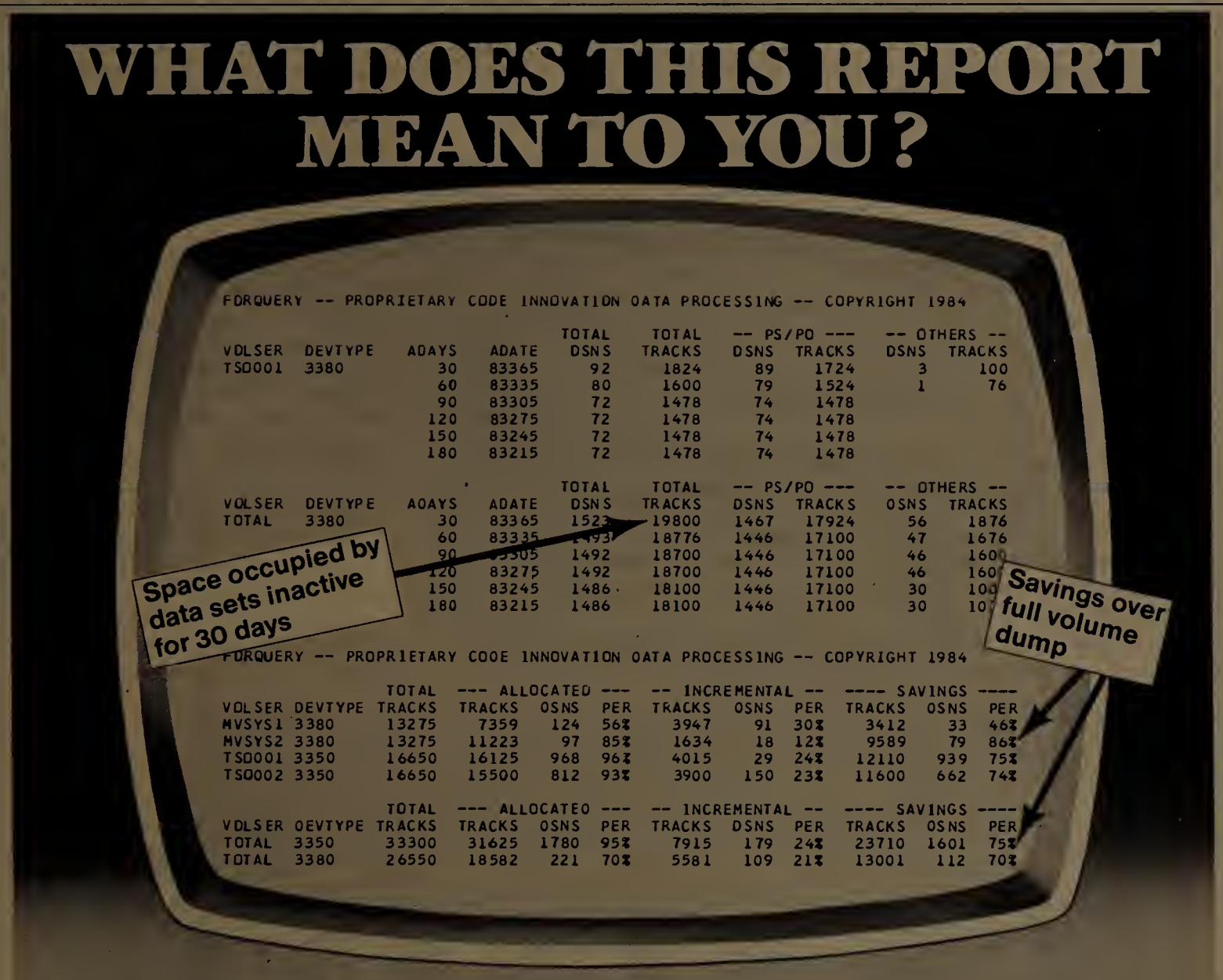
"The producer has complete control of that. It [the program] automatically adjusts the scheduled times for everything when you add a segment," she reported.

She added that ABC was experimenting with IBM 3290 four-screen terminals for its writers, who were able to write scripts on one screen while viewing displays of the program lineup and background information on other screens.

Each network also made use of lap-size computers, as they had throughout the primary campaigns.

ABC and CBS correspondents were using Radio Shack TRS-80 Model 100 portable computers to carry about information such as biographies of key Democratic personnel, campaign staff lineups and primary results while on the convention floor.

In ABC's case, correspondents used the portables to draft scripts and upload them into the system using acoustic couplers.



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NEWS

County runs award-winning network on slim budget

By David Myers
CW New York Bureau

ROCHESTER, N.Y. — On an annual budget that data processing directors in private business might set aside for supplies, David A. France has managed to put together a distributed network for Monroe County, N.Y., that has won awards for its sleek modernity and curried favor from IBM.

France, the 50-year-old director of data processing for the upstate New York county of 700,000 people with its seat here, has marshaled efforts to develop and install a first-of-its-kind criminal records tracking system for the county's sheriff and seven police departments, plus a ground-breaking land deed and property title data base for the county clerk.

"I can't take the credit for it," France said in a recent interview at his offices in the basement of the 90-year-old one-time courthouse, which now serves as the county's central office building here.

'The whole department'

"Anything that we've accomplished has been the work of the whole department. And the only reason we've been able to accomplish what we have is because we have a progressive county administration that understands the need for state-of-the-art data processing."

The stiffest challenge facing any DP manager in public life is not to waste taxpayer's money. France's department must run a network supporting 350 devices and 165 word processing users without one byte of excess capacity on the network. "We have a public responsibility to use our capacity to the utmost," France noted.

But France partly credited the county government's close relationship with IBM to its ability to develop and maintain the countywide data network on an annual budget of only $3 million — three-quarters of 1% of Monroe County's $400 million in expenditures. The mean average for county DP departments in the U.S. is around 4% to 5%.

"We were the first public sector customer of the IBM Credit Corp. We went to them and said, 'If anyone should be an [IBM Credit Corp.] customer, it should be a government.' They weren't sure at first — no one had ever put it to them like that. But they went back, discussed it and were sold," France explained, saying the county had saved $189,000 last year as a result of its lease arrangements with Big Blue and expected to show savings of $1.5 million over five years.

In addition, France holds meetings every other week with representatives from IBM to inform Big Blue of the county's system proposals and to see if IBM has new products coming out soon to help put those systems into effect.

But system advances and dollar savings from lease arrangements are just part of the story behind Monroe County's ability to develop unprecedented and far-flung network systems in a time of austerity in government spending, according to France. The real hero of the story, he said, is County Executive Lucien A. Morin.

Morin, a Republican who was elected to office in 1983 after serving nine years as the appointed county manager, took an early interest, uncharacteristic for public officials, in data processing and office automation. To streamline the county's decision making, he created a council of the county's highest-ranking office holders with absolute power to assess data processing needs and give the go-ahead on development plans.

CW photo by D. Myers

David A. France

"The committee doesn't make recommendations, it makes decisions," France said, who serves as a full voting member. As a result, France is never trapped into the no-win position of allocating scarce DP services to clamoring would-be users. If a department head comes to him with a request, France sends him to the commissioner who heads up his branch of the county government.

National awards

France has done a notable job in his three years as county DP director. Two of his computer systems have won awards from the National Association of Counties:

■ An on-line data base and electronic message system for Monroe County's sheriff and seven police departments, with inquiry capability extended to the state police, the district attorney and the probation department. Operational as of January 1, the system is known as the Law Enforcement Administrative Data Entry Retrieval System. It lists all arrests and arrest warrants within the county and cross-references offenders by known aliases, helping the police to coordinate their crime-fighting efforts.

■ A similar on-line data base for the county clerk's office which lists all land deeds, property assessments and title history. Called Mirrors, the six-month-old system is equipped with public terminals on which privately-employed abstractors can do land record searches and get the system to perform automatic mortgage tax calculations.

Besides these two systems, the county DP department has been credited with improving the collection rate on delinquent taxes, netting the county coffers hundreds of thousands of dollars in additional taxes.

And for the 5,000 county workers who use it to complete their daily work, the countywide data network seems to be as good at generating reports as praise. Word processing users can pick up printed documents the same day if requests are made before noon; other users can get next-day delivery on requests made before 3:00 p.m.

France credits his two-year tenure as director of systems for the county's department of social services to his sensitivity to user needs. "When I took that job I suddenly became a user after six years in the DP department — I saw things from the other side. When I came back as director, I wanted to make sure we got back to being a service department," he said.

As director, France established a users' support group within the department. Under the guidance of Thomas Fiorilli, assistant DP director, the team of four does all the training, troubleshooting and needs analysis in the county.

Despite an industrywide turnover rate estimated by the American Electronics Association at over 20%, France said not one of the county's 58 data processing workers have left their job in the past two and a half years. And "in government, we're not very competitive in the salary war," France admitted.

How does he keep his workers, then? "I try to get everyone to realize his place and the importance of his role in the department. Motivation and stability breeds satisfaction," France pointed out. "There's a sense of pride in this department that's very satisfying to watch — both for an individual's sake and in terms of the department's mission."

As for himself, even though he could earn more in business, France said he has no intention of giving up his post.

"Managing in government means being answerable to many more people," France said. "It means I have to spend most of my time talking up systems, selling our ideas, translating technical jargon into plain English. But it seems to come easy for me. I'm not sure why. Maybe it has something to do with honesty. I'd like to think so."

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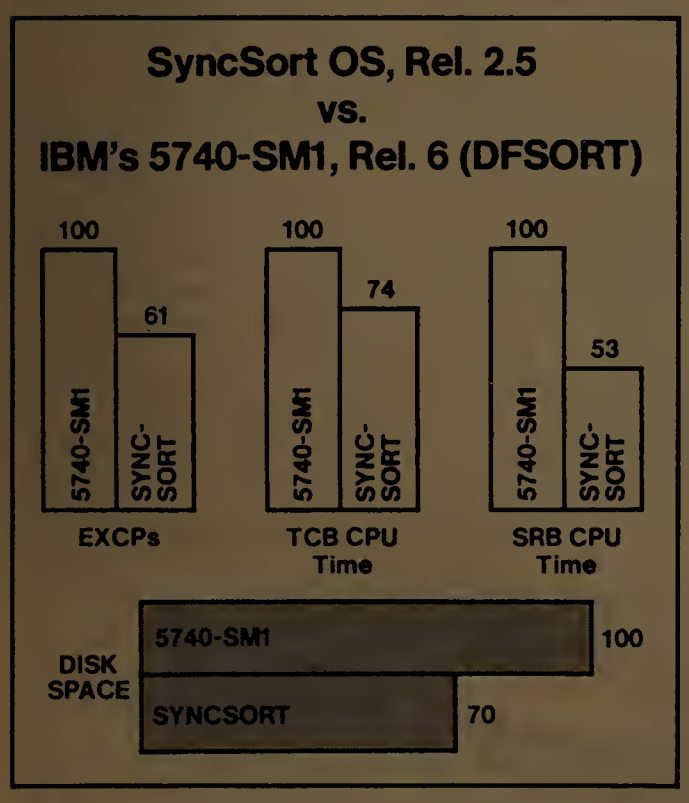

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EEC decision in IBM antitrust case imminent

BRUSSELS — The Executive Commission of the European Economic Community (EEC) is expected to render a decision this week in its antitrust action against IBM.

Although the commission is said to be close to a decision in the four-year-old case, it was not known at press time whether the EEC would issue a judgment against IBM or announce a compromise settlement with the company. Some analysts speculated last week that the commission, which contends the company has abused its role as the dominant computer firm in Europe, will rule against IBM.

The principal issue at stake concerns IBM's timing in disclosing technical details of new computer products. The EEC has said the company should be required to reveal technical information at the time a product is announced in Europe.

IBM, which traditionally makes technical information available at the time a product is shipped, has countered that such a practice would give its competitors an unfair advantage in the market.

In a recent interview with *Computerworld*, IBM's President John Akers, who noted that the company has "always made information available in great amounts for our customers," said the firm had no intention of giving away the "fruits of its research and development" to competitors, alluding to the pending EEC matter.

The commission has already rejected one IBM proposal to settle the case and is reportedly negotiating with the company over a second proposal. Neither side has revealed the terms of the proposals.

The commission's investigation originated more than 10 years ago, when two American companies — Amdahl Corp. and Memorex Corp. (now a subsidiary of Burroughs Corp.) — filed complaints.

The two companies charged that IBM's policies prevented competitors from selling compatible computer equipment on a timely basis.

Government study to target office stress

Three-year project to examine VDT-related problems in women

By Mitch Betts
CW Washington Bureau

WASHINGTON, D.C. — The National Institute for Occupational Safety and Health (Niosh) plans to begin a scientific study this year to find out what aspects of modern office work generate the most unhealthy stress for female secretaries and data processing clerks.

A major part of the three-year study will be a technical examination of the effects of VDTs on stress, including such factors as the work routine, keyboard design, screen display features, lighting and the comfort of the workstation and chair, according to Barbara G. F. Cohen, the Niosh research psychologist who will direct the study.

Once approved by the White House Office of Management and Budget (OMB), the study, which is titled "Chronic Stress in Office Work," is expected to begin this fall with a survey of 1,000 clerical workers who use computer terminals, Cohen explained in a telephone interview from her Cincinnati office.

White-collar stress

The study will be the first broad, scientific study of white-collar stress, she said.

"Although office work is the largest and fastest growing sector of the work force, there has been little research on this group of workers and their related stress problems," stated the Niosh documents explaining the proposed survey.

The fragmented research that has been done, according to the Niosh documents, indicated that clerical workers have a high incidence of stress-related illnesses, such as heart ailments, and that data entry clerks working at VDTs, in particular, experience high levels of stress and discomfort.

Will focus on women

The Niosh study will focus on women, because a 1981 study demonstrated that female clerical workers have twice the chance of developing coronary heart disease, compared with other female workers, the Niosh documents said.

One-third of all working women in the U.S. have clerical jobs, according to Niosh.

Cohen emphasized that the study will search for both the positive and negative aspects of office work. "I'm looking not only for what makes them feel ill, but also what makes them feel good," she said, adding that the study should prove useful to business managers trying to improve the office environment.

Moreover, the study is designed to discover how a woman's family burdens affect her work and attitudes and to discover what coping mechanisms — such as drinking alcohol, overeating, exercising or praying — are used to handle stress, according to Cohen.

Questions for female workers

To learn more about office stress, the questionnaire will ask each female clerical worker about:

- How much the office equipment sets the pace for her work.
- Whether she feels she will be replaced by a computer or other machine in the next five years.
- Whether she is treated like "an extension of an office machine" or is treated with dignity and respect.
- Whether she has any say in the choice, placement or use of new office equipment.
- The kind and quality of training the company provides her for new equipment or new procedures.
- The quality of the office environment, including the comfort of the chair and workstation, the quality of lighting and the level of noise from office equipment.
- Any physical ailments she experiences, such as back- or eyestrain.

Completed by 1,000 workers

The survey will be completed by 1,000 office workers, 500 from a government office and 500 from a bank or insurance office, Cohen maintained. (The offices have not yet been selected.)

In addition, the study will include interviews with some of the respondents and a technical examination of the office layout, furniture and computer terminals.

Assuming the OMB approves the questionnaire, the survey will begin in September or October, according to Cohen.

Under the Paperwork Reduction Act, the OMB must approve all questionnaires that are issued by federal agencies.

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Labor Department creates automated national job bank

By Mitch Betts
CW Washington Bureau

WASHINGTON, D.C. — A computerized national job bank has been established by the U.S. Department of Labor to help job seekers — including DP professionals — reach employers anywhere in the country, without any fees.

The Interstate Job Bank, which compiles the computerized job listings kept by state labor officials into a master list, already has about 8,500 job openings listed in the system, officials said. Among the listings are dozens of openings for computer programmers, systems analysts, data clerks and DP managers.

A recent sample of the listings showed, for example, job openings for an EDP manager in Woodbury, N.Y. ($23,000 a year); a DP analyst in Trenton, N.J. ($26,000); an information systems analyst in Greensboro, N.C. ($30,987); a DP director in Edinburg, Texas ($18,179); and a programmer-analyst in Wakesha, Wis. ($28,200).

In all, the sample listed nearly 200 DP positions, with most in the states of New York, New Jersey, Texas, Minnesota and Massachusetts.

In essence, the new job bank combines the computerized job lists offered by state-run employment offices into a master list. "An interstate system is essential in this country," commented Labor Secretary Raymond J. Donovan.

"It makes certain that a jobless engineer in Pennsylvania is aware of job openings in his or her specialty in Florida, Texas, Connecticut or perhaps just across the state line in New York or other neighboring states," Donovan said.

State employment offices have programmed their computers to select job offerings that have not been filled locally within a reasonable period of time (usually 10 days). These listings are then transferred to a computer tape and sent by overnight mail to the Interstate Job Bank in Albany, N.Y., to create a master list. A microfiche of this master list is mailed out weekly to all state employment offices, where job hunters can inspect the listings.

If the job hunter finds an attractive listing, he or she may submit a resume to the employment office, which forwards it to the employer if the applicant is qualified, officials explained. Negotiations and interviews for the job are the responsibility of the job seeker and the prospective employer.

Donovan stressed that listings in the Interstate Job Bank are those that were not filled quickly in the state. Because unskilled jobs are filled locally, the national job bank tends to have job listings for professional and highly skilled jobs, with wages and salaries ranging from $7,100 to $70,000, he said.

"The more skilled jobs or the specialty jobs commanding higher salaries usually don't have as many qualified applicants in a given locality, and those are the ones that end up in the national system," Donovan said.

ILINK from page 1

der, a consultant at Metropolitan Life, listed a few examples of what Metropolitan employees may do with the package. "Currently, many users can receive mainframe information only in a limited number of reports," Alexander said. "It makes sense to allow them to download mainframe data so they may create whatever report they need."

Personnel information was cited as another future Ilink application. "Personnel information is stored on a large data base, which is difficult to access," Hearst said. "Since our regional offices already have personal computers, they may want to download data to build office personnel files."

The information center manager does not foresee security risks by allowing users to download mainframe data. "The user doesn't access production run data: It is soft data based on an extract of production data," Hearst noted. "He has access to this data now. We are just saving him the task of rekeying files with 20,000 or more records."

Ilink also possesses uploading capabilities. "A committee of users and data processing managers sets uploading standards that ensure data integrity," Hearst said. "The standards are based on security measures we already have for manual entries."

The package can cross-load data between mainframe or microcomputer applications. "Since we possessed connections between our mainframe packages, we don't use Ilink to move data between mainframe applications," Alexander said. "We do cross-load a lot of microcomputer data with the package."

Hearst suggested limiting the package to experienced users. "I wouldn't hand the package to a novice user," Hearst said. "It can be difficult to access and manipulate data. We are attempting to help our users by building Execute routines which simplify the process of transferring data."

An enhancement she would like to see is the ability to handle packed data. "Much of our data is packed, and transferring it to the microcomputer is extremely tedious," she said.

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NEWS

Mob flexing computer muscle to streamline operations

Assistant DA claims underworld recruits DP pros, pegs losses at over $100 million

By John Gallant
CW Staff

ATLANTA — Gambling, prostitution, auto theft — the crimes and the motives behind them have changed little over the years. But the methods used by organized crime to perpetrate these offenses, and a variety of others, have taken a sinister turn.

Enlisting the aid of technology and highly recruited DP professionals, organized crime is computerizing its operations to become more efficient and more profitable. This disturbing trend has added to the growing difficulties encountered by law enforcement agencies ill-equipped to handle computer crime, according to Fredric Tokars.

Tokars

Tokars is an assistant district attorney for the Atlanta Judicial Circuit, specializing in the investigation and prosecution of computer and white-collar crimes. Tokars worked in data processing auditing as a certified public accountant at Price, Waterhouse & Co., and he holds a Certificate in Data Processing. He studied law at night while employed as a programmer and systems analyst with NCR Corp. and later became corporate counsel to Southern Bell Telephone Co.'s data processing procurement department.

Nabbed Georgia students

After joining the district attorney's office, Tokars helped University of Georgia at Athens (UGA) officials nab two Georgia Tech students found illegally accessing the UGA computer for profit. While costly to the university, the incident seems almost harmless when compared with the increasingly sophisticated use of computers by organized crime. (See story below.)

"Organized criminals have been getting advice from attorneys for years," Tokars said. "Now these same crime leaders are talking to computer professionals. They are giving the criminals the information and statistics they need to run an ultramodern criminal enterprise. They are automating in the same manner as American business.

"DP professionals are most certainly being recruited by organized crime," Tokars continued. "It sounds incredible at first, but it only stands to reason. They have their own accountants and attorneys, why not computer experts? Through their legitimate business enterprises, organized [criminals have] access to all the information processing sophistication they need. These criminals also have a lot more money with which to buy this equipment. When they want a computer professional, all they have to do is go to a person working in a regular business and offer to double his salary. You can bet that person will go to work for them."

According to Tokars, information on criminal activities that was once recorded in simple ledgers and black books is now maintained on hard and floppy disks as part of complex computer networks linking organizations across the nation.

"The crimes are the same as those that occurred as many as 100 years ago. But by using computers, not only are the crimes better managed and more profitable, but it is a lot harder for law enforcement agencies to obtain evidence about them. If the authorities attempt to execute a search warrant at the central computer location, all the operator has to do is perform some simple programming procedures to erase or manipulate all the files in the system," Tokars said.

Taking advantage of agencies

In addition to organized crime, white-collar criminals are taking advantage, on all levels, of law enforcement agencies that lack the training and funding to investigate computer-related crimes adequately. Using figures obtained from the Federal Bureau of Investigation, Tokars estimated that computer crime costs U.S. businesses at least $100 million annually.

"I only use that figure because I can reference it back to federal officials," Tokars said. "I think it is actually much higher. That number represents only the value of goods or assets actually stolen through computers. I maintain that there is much more lost that we do not even know about because computers are used after crimes to hide losses and cover up thefts.

"Law enforcement authorities are really not knowledgeable yet in the area of computer crime. The average police officer, investigator, prosecutor and judge knows very little about computers. But even if they become experienced in the field, it is very difficult to explain to a jury about electronic funds embezzlement or wire transfer fraud," he added.

As a result, enforcement agencies often are reluctant to investigate and prosecute computer crimes. "Because of the problems involved, we tend to shy away from prosecution. We try to plead [plea bargain] the cases out, or we attempt to prosecute them under alternative statutes. It is much easier to explain a burglary or a theft-of-services statute to a jury. When you get into the illegal accessing or manipulation of computer data, all of a sudden you have got three times as much trial preparation, and you run a good chance of losing the trial because the jury becomes confused," Tokars said.

According to Tokars, companies often choose not to prosecute employees involved in computer crimes because they fear the damaging impact of negative publicity and the possibility of civil suits by accused workers. What is worse, firms sometimes promise not to prosecute an employee in return for the worker's cooperation in revealing the computer system vulnerabilities that made the crime possible.

Tokars applauded state and federal efforts to implement computer crime laws, but he warned that statutes alone may not be enough. "Just the existence of a law does not ensure that it can be adequately enforced. Law enforcement agencies have to focus on education and training in computer crime techniques, and they have to instill an awareness of the problem in the people who work for them," he said.

In addition, Tokars urged the creation of a specialized judicial branch, similar to bankruptcy court, designed to deal with computer crimes. "We are going to see a lot more of these crimes in the future, and it may be that we need a special type of panel to deal with high-technology crime. We are going to need some specialization because we are just not equipped to handle this problem through regular judicial channels," Tokars said.

Systems used to track stolen car parts, prostitutes

"A typical gambling organization, 10 years ago, maintained its records on flash paper impregnated with gun powder so they could be destroyed if the ring was raided.

"Now they keep the information on computer tapes or disks that can be quickly erased or manipulated," Fredric Tokars said.

Tokars, a Georgia assistant district attorney specializing in the investigation of computer and white-collar crimes, outlined some recent examples of the ways in which organized crime uses computers to manage its criminal pursuits.

■ One nationwide gambling ring maintained a central mainframe computer tied to microcomputers in 43 branch offices. Each night, gambling information collected at the remote locations was uploaded to the mainframe and consolidated for profit analysis and report generation.

■ A criminal organization based in California maintained a computerized data base with an inventory of automobile parts stripped from cars stolen across the country. Criminals in some 30 cities, equipped with either terminals, minicomputers or micros, had access to the data base and could perform inquiries on inventory levels in each of the cities. Through the network, the car-theft ring could determine where demand was greatest for individual parts. Hot parts could then be moved around the country to maximize prices, Tokars explained.

Prostitution ring

■ One low-level, yet very sophisticated, Northeastern prostitution ring used a centralized computer system to track its stable of prostitutes around the nation. The system maintained information on the women's arrests and aliases to help them avoid prison sentences as repeat offenders.

The ring was able to keep the prostitutes moving from city to city, spreading out convictions under different aliases.

■ Several cases uncovered by investigators indicate that organized crime is using computers in the laundering of money obtained through criminal activities. Simple ledgers, Tokars said; just don't cut it anymore.

Instead, computers allow organized crime to track its funds as they are shifted to and from foreign banks, such as those in the Bahamas or the Grand Cayman Islands, where reporting regulations are lax, according to Tokars.

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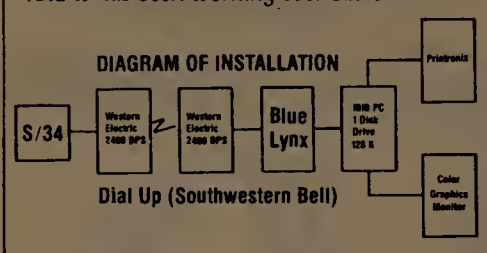

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NEWS

Raid nets computers allegedly used to access Nasa files

By John Gallant
CW Staff

HUNTSVILLE, Ala. — Armed with federal search warrants, agents from the Federal Bureau of Investigation last week raided four homes here and seized computer equipment allegedly used to access illegally computer systems at the National Aeronautics and Space Administration's (Nasa) Marshall Space Flight Center.

Officials at Marshall, also located here, contacted FBI investigators in Birmingham, Ala., after security administrators at the facility discovered in late June that "an unknown person or persons" had gained access to two Digital Equipment Corp. PDP-11/34 processors through standard telephone lines. A Nasa spokeswoman said the intruders had "intermittently disrupted" operations of the computer systems, which did not contain any classified or sensitive data.

According to Thomas Moore, special agent with the FBI's Birmingham office, the illegal access was detected by security systems in place at the Nasa research facility, which operates approximately 150 computer systems. He said the agency and Marshall officials believed that some data in the computer systems was destroyed or erased by the intruders.

Neither Moore nor Nasa would divulge the type of computer equipment seized as a result of the FBI investigation. But he said the "computers and related equipment" were confiscated as possible evidence of violations of federal theft of government property and destruction of government property statutes, each of which carries a maximum prison sentence of up to 10 years and a fine of up to $10,000.

Moore said no arrests had been made yet in the case, but the agency believes the intrusion was the work of four unnamed teenage boys who lived at the residences raided last week. Nasa officials would not divulge how the security systems at Marshall detected the illegal access, and Moore declined to say how the FBI traced the intrusion back to the Huntsville homes where the computers were seized. Moore said the FBI was continuing its investigation and planned to turn evidence in the case over to the U.S. Attorney's office in Birmingham for prosecution early in August.

The incident is reminiscent of last year's [CW, Aug. 22] penetration by about a dozen youths of computers at the Los Alamos (N.M.) National Laboratory nuclear weapons research center. In that case, the security breach also involved only unclassified documents, though none of the data was erased or destroyed. The local youths involved had also gained illegal access to systems at the Milwaukee School of Engineering and the Security Pacific National Bank in Los Angeles.

The Nasa spokeswoman said the PDP-11/34s involved in the Marshall intrusion were used to support the facility's Space Physics Analysis Network and Engineering Operations departments. J.N. Foster, director of administration and program support at Marshall, said one of the computers was used by programmers to develop software for use in other Nasa facilities, and the second stored data used in atmospheric research. He labeled data residing in the systems as research information that was already available to the public through the agency's Space Science Data Center located in Greenbelt, Md.

The intrusion was the first of its kind at the research facility, according to Foster, who added that Marshall officials did not know why the two PDP-11/34 computers in particular had been targeted by the intruders. He said systems administrators periodically review security measures in place at the center and would continue to do so in light of the illegal access.

DEC's Olsen to address federal computer meet

WASHINGTON, D.C. — The seventh annual Federal Computer Conference will be held here Sept. 18-20 at the Washington Convention Center.

Sponsored by the National Council for Education on Information Strategies, the conference will focus on "Harnessing DP Technology."

The conference, held principally for federal data processing personnel, consists of three days of sessions and workshops and a two-day exposition of computer systems and services. Some 130 federal and industry experts will address full-day professional enhancement seminars and half-day sessions on a variety of tracks, including microcomputers and software strategies.

Kenneth H. Olsen, founder and president of Digital Equipment Corp., will be the keynote speaker.

Registration fees range from $95, for one day's main conference program for federal employees, to $395, for nonfederal personnel for the full three-day program.

More information is available through the Federal Computer Conference, P.O. Box N., Wayland, Mass. 01778.

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Industry pioneer speaks positioning for mainframe

ADR's Goetz: learning from

This year represents three milestones for Martin A. Goetz. It's the 25th anniversary of Applied Data Research, Inc. (ADR), the company he co-founded in 1959. It's also Goetz's 30th year in the software business. And he celebrated it in May by enjoying a promotion to president of ADR.

Goetz has been a leading spokesman for the independent software community longer than most independents have been in business. He was the principal developer of Autoflow, developed in 1965, which was the first software product ever sold nationally by an independent software company. In 1968, Goetz set another precedent by receiving a patent for a sorting package, the first patent ever awarded for a software product. He also holds a patent for Autoflow.

Goetz was interviewed recently by Computerworld's *Senior Editor/Software Paul Gillin, CW photos by J. Connolly.*

Q Most of the large data base and systems vendors seem to be moving in roughly the same directions. Would you outline some of the differences between ADR's strategy and those of other vendors?

Our number one strategy is to concentrate in systems software for IBM mainframes, but not to stay exclusively in the data base area. We're basically in six technologies that we want to merge together: data base management, application development, office automation, on-line programming, decision support and performance measurement.

What differentiates us from the competition is, first, we were into relational data base from the mid-'70s when we acquired [Insyte Corp.], which had built a relational data base and a data dictionary on the same data base. They were espousing the benefits of relational data base at a time when relational was not considered appropriate for production data bases. We've stayed with that philosophy.

If one looks at our application development system [Ideal], which was five years in the making, that again stands out. It's a system that would be used to develop central or complex applications and can be a complete replacement for Cobol.

Q What were some of the key decisions you've made that have been responsible for your company surviving for 25 years?

Our number one reason is that I personally believe a software product can have a very long life. Some of our products have their roots in the late '60s or early '70s and are still very viable because we've improved the product each year. We have basically stayed with the products that we thought would perform a basic function, such as [our] Librarian [package], to which we've made major enhancements over the years. As long as functions remain, we will make major investments in those products. I think we'll be improving Ideal for the next 10 to 15 years.

We try to provide the best products for two reasons. One is to beat IBM. In order to do that, companies have to have better products and not imitations. We're never going to try to beat them on price.

The second reason is that we have a kind of single-minded focus, which is to stay in systems software. We think it's a very broad and growing market. So we haven't [stayed in] areas where we didn't know the marketplace.

Q What features do you think are missing from most application development systems today?

One is the richness of the language. The other is how it appears to the developer when he's developing complex applications — the way you define screens, the way you can look at information from the data dictionary and so on.

When one develops an Ideal application, the user doesn't know whether it's going to run on [IBM's] DOS or OS. One doesn't know what teleprocessing monitor it would run under or whether it's batch or on-line. Your focus is purely on the problem and not on the characteristics of the machine. You're writing in a very high level, so if there are changes to the data structures, you don't have to spend a lot of time in maintenance.

Q You emphasize the centrality of the data dictionary to your entire line of products. Why?

It turns out that the data dictionary has applications to source library systems, to decision support systems, to on-line program development and so forth. We think that [data dictionary integration] not only provides consistency, but gives the installation a great deal of control over who uses data and where the data is used, particularly in the areas of maintenance.

Q Why have the so-called productivity tools been catching on so slowly?

For one thing, there's a tremendous resistance to change. Secondly, they've been oversold in previous years. They've also been limited to certain kinds of [simple] applications. But as there's a greater recognition that there are significantly better ways of developing applications than in Cobol, companies will move away from Cobol.

In the '70s, data base systems were never as good as they were touted. They didn't really reduce the level of programming; you still had to navigate through the data base. It's only with the advent of fourth-generation application development systems in the last two to three years that there was significant motivation for people to go away from Cobol.

Q Cobol has been getting a lot of bad press lately. What do you see as being the place of Cobol in the DP shop in the 1990s?

I think it will primarily be used to maintain existing applications or applications written by vendors in Cobol that have to be modified. By the '90s, we'll see very little Cobol programming. But for the next five or six years, you'll see quite a bit.

However, I don't think that in 10 years, more than 10% to 20% of programming will be done in Cobol, [due largely to] more confidence in high-level application development systems. There's nothing inherent in an application development language that one could not achieve or surpass the performance of Cobol although one might not achieve the level of performance of assembly language.

Q In the last 10 years, [Cullinet Software, Inc.] has come out of the woodwork and threatens to pass you in revenues soon. What has Cullinet done right?

The first thing they did right was get into the data base area a significant number of years before ADR got into it. When Cullinet got in in 1973-74, ADR decided not to go into that area at that time. But when we did get in, we started with a base of $2

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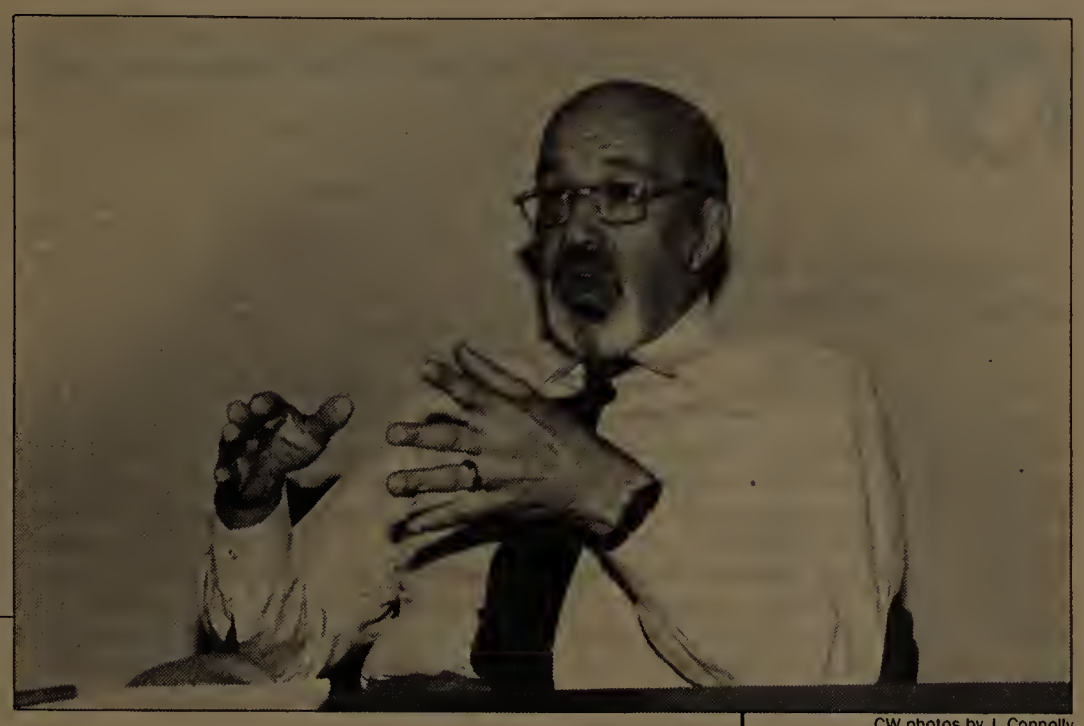

CW photos by J. Connolly

million in revenues in 1978, and in 1983, we had $28 million in data base sales and about $4 million in Ideal. In '83, we grew our data base business over 100%.

One reason is we built our data base on a purely relational model. We did not believe the Codasyl data base model would be successful, and we were right. E. J. Codd has said recently that there is nothing inherently inefficient about relational data bases. We've been preaching that for the last five years. Anyway, our number one priority is to be successful and not to look at Cullinet.

Q How do you achieve performance in Datacom/DB that is as efficient as a network-based system?

We have a very efficient indexing system. The basis is what we call a "compound index." The basis is how you use the index before you actually try to retrieve the data and how you organize the data on disks. We have a very efficient way of retrieving data and compressing the index. So I can get rid of information that's repetitive. When you compress an index, you can store a lot more in memory.

We also have what we call a "relational index" so that when we actually retrieve data, we do it knowing which records we have to retrieve by using the index. We do not need preconceived paths, and we don't have to navigate through the data using pointers. We have users that have millions of records, and the response times have been excellent.

Q Last year you announced an agreement with Visicorp as part of your Information Architecture. In light of all the recent troubles at Visicorp, have you reconsidered your ties with that company?

We've reconsidered it. We still plan to interface our data base products and office automation products on the [IBM Personal Computer] with [Visicorp's] Visi On, although there have been some delays because of the debugging environment that's currently required.

But we're not exclusive with Visicorp. In our agreement with MSA [Management Science America, Inc.], we're planning to interface our [Personal Computer] products with the Decision Manager from [Peachtree Software, Inc.].

We've always planned to interface to existing products such as [Ashton-Tate's] Dbase II and [Lotus Development Corp.'s] 1-2-3. When there are existing application products on the market, rather than try to compete in that marketplace, we'd rather extend our products and work with proven products.

Q When are MSA and ADR going to become one company?

There are no plans for that to happen in the future. However, I can't discount that happening. ADR has been independent for 25 years, and I think both companies look to remain independent.

We do have similar styles, but our plans are to remain independent companies and to have very close working ties.

Q ADR made an agreement with EDS [Electronic Data Systems Corp.] last year as part of the Viable contract. EDS just announced an agreement with Cullinet. What does that mean to your relationship with EDS?

We were certainly disappointed in not reaching an agreement with EDS. It was strictly on the basis of financial concessions [that] EDS wanted. At one point, we expected to get the agreement with EDS, and the reason we lost was purely on the financial end of it.

We still have a very good relationship with EDS. They've standardized on our electronic mail system within their corporation and on Roscoe within all their data centers.

Q What do you think IBM's plans are in the data base market and the systems market in general? Do you think they're going to become more aggressive?

Personally, I believe they've been very aggressive over the years, and they're not going to get any more aggressive than they have been in the past.

I think you'll see the emergence of [IBM's] DB 2 late this year, but I think IBM's IMS and DL/1 will exist for many years. I think they are in a very strong position now.

In previous years, IBM had products that were relatively low-priced. Now you're seeing products that are very high-priced for the mainframe. Our business is growing faster than ever, so I don't see a general trend that will hurt ADR.

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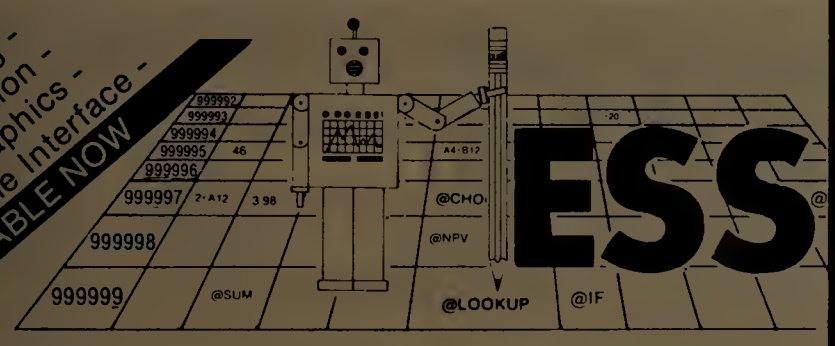

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Phil Hirsch
CW Washington Bureau

NTIA supports AT&T bid to market terminals directly

WASHINGTON, D.C. — AT&T should be allowed to market terminal equipment directly, rather than through a separate subsidiary, the National Telecommunications and Information Administration (NTIA) told the Federal Communications Commission earlier this month.

NTIA, President Reagan's chief telecommunications advisor, was commenting on a petition that AT&T submitted to the FCC on April 30. AT&T wants the commission to remove the "separate subsidiary provision" from its Second Computer Inquiry decision, a provision requiring AT&T to offer terminal equipment and computer-based, enhanced services only through a separate, deregulated subsidiary.

AT&T no longer can price its terminal equipment below cost and make up the loss by overpricing its interstate communications services, NTIA said. This was a major justification for the "Computer [Decision] II" separate subsidiary requirement. According to NTIA, AT&T's ability to cross-subsidize is constrained by growing competition in the interstate services market.

The situation is "less straightforward" regarding enhanced services, the agency added. Since competing vendors need AT&T interstate circuits, the phone company retains an ability to be anticompetitive, NTIA said. So the FCC should not remove the separate subsidiary requirement for enhanced services, but should "indicate its willingness to consider waiver requests on a timely basis."

Satellite Business Systems (SBS), however, contended that the commission recently allowed AT&T's Information Services division to resell basic services "relying on the presence of the Computer [Decision] II safeguards . . . including the separate subsidiary requirement." SBS vigorously opposed NTIA's and AT&T's contention that the interstate communications market is now sufficiently competitive.

FCC defers AT&T rate cut, calls for justification

WASHINGTON, D.C. — A further 6.1% reduction in AT&T's reduced-rate Reach Out America tariff will be deferred until this Wednesday, July 25, the Federal Communications Commission decided earlier this month. The commission insisted that the company must provide additional justification for the lower charges.

Meanwhile, the U.S. Department of Justice, plus a number of AT&T's competitors, have objected to the original tariff, now effective in 25 states and scheduled to become effective in the remainder by the end of September.

AT&T wants to lower its Reach Out America charges an additional 6.1% because present rates don't reflect the reduction in the long-distance Message Toll Service tariff that became effective May 25.

The original Reach Out America tariff went into effect June 7.

Critics object to the rates because they don't cover AT&T's costs. The FCC's common carrier bureau, while acknowledging this, said the commission is now reviewing the tariff and might solve the problem by authorizing a lower access charge for services provided during off-peak hours.

Wirth questions FCC reaction to AT&T private-line backlog

WASHINGTON, D.C. — U.S. Rep. Tim Wirth (D-Colo.), a key communications policymaker on Capitol Hill, wants to know if the Federal Communications Commission is "satisfied" with AT&T's efforts to reduce its backlog of uncompleted private line orders. In a recent letter to FCC Chairman Mark Fowler, Wirth, who heads the House telecommunications subcommittee, asked if the commission anticipates taking any formal action against AT&T.

Wirth added that his opposition to the FCC's original access surcharge plan "has not diminished." That plan would have transferred to residential subscribers most of the local access costs previously borne by long-distance users. Although the commission has deferred surcharges for residential and single-line business users, it has not done away with them.

In another letter, Wirth reminded chief executive officers of the divested Bell operating companies of a recent AT&T proposal requesting FCC permission to interconnect AT&T's interstate private-line facilities with customer-provided local access lines, lines which would not necessarily have to be obtained from a local telephone company. "In other words," Wirth explained, "AT&T has proposed to bypass the local-exchange carrier and provide interstate service directly to large corporate customers."

USPS submits bid to PRC to reclassify E-Com

WASHINGTON, D.C. — The U.S. Postal Service (USPS) has submitted a reclassification request to the Postal Rate Commission (PRC), thus officially beginning the process of selling or leasing Electronic Computer-Originated Mail (E-Com), its controversial electronic mail service.

Postal officials said they are seeking an arrangement similar to the one already established with Western Union, Inc. for Mailgram. service, whereby E-Com equipment would be owned and operated by the private partner, but would remain on postal premises.

The agency would be paid for the space, utilities and administration.

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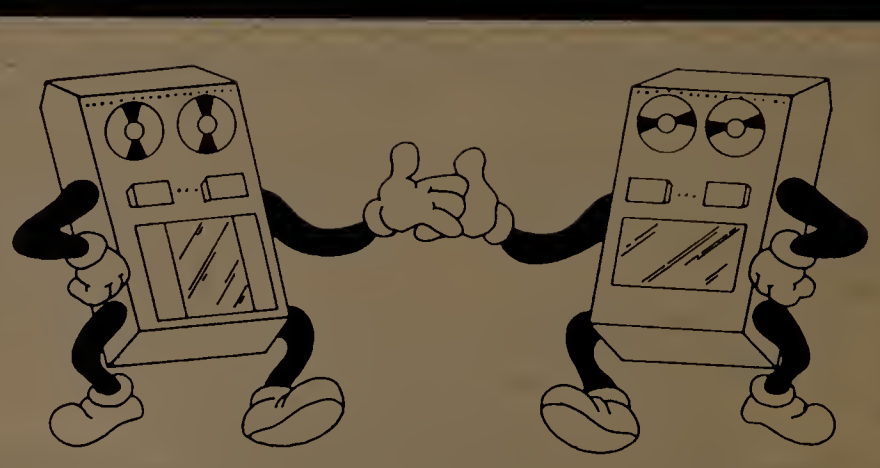

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Court action to decide fate of consumer-oriented EFT

EFT Association files first amicus curiae brief in its history to continue service

NEW YORK — Consumer-oriented electronic funds transfers are doomed if a federal judge is upheld in his ruling that an automated teller machine (ATM) owned by a retail store is a branch bank, the Electronic Funds Transfer (EFT) Association charged in a brief filed with the Second U.S. Circuit Court of Appeals here.

Attorneys for the association of bankers, software houses and retail stores filed the first amicus curiae (friend of court) brief in the organization's seven-year history in the case of Wegmans Food Markets, Inc., an upstate-New York chain that linked ATMs to a network run by Marine Midland Bank, N.A.

A Rochester-area bank, Canandaigua National Bank and Trust Co., and the Independent Bankers Association of New York State, Inc. successfully sued Wegmans and Marine Midland on the claim that the ATMs violated state and interstate banking regulations [CW, April 23].

EFT Association President William R. Moroney said, "This is the first time the EFT Association has ever filed such a brief with any court. We did so because, as we state in our brief, 'The outcome of this case may well determine whether consumer-oriented electronic funds transfer systems involving all types of national and state financial institutions will continue to operate on a multistate basis using shared terminals, as they have for the last eight years, or if EFT will suddenly shrivel to something on a much smaller scale. In the latter case, public service and convenience will be greatly diminished, and millions of dollars which the entire EFT industry has spent on developing these shared systems will have been wasted.' "

The association brief added that EFT at the point of sale is only practical if the customers of many financial institutions in regional and national market areas are able to share the use of common electronic terminals.

The brief said shared networks are an integral part of the national and state banking systems, and that the EFT industry has spent millions of dollars building EFT networks, while relying "in good faith" on a 1976 decision by the U.S. Circuit Court of Appeals for the District of Columbia, where the judges said an ATM is a national bank branch only if it is owned or rented by the bank and gives the bank a competitive advantage.

Three report profits up

Three major computer manufacturers — Burroughs Corp., Honeywell, Inc. and NCR Corp. — last week reported increased quarterly profits of 34.5%, 26.6% and 11%, respectively.

But microcomputer maker Apple Computer, Inc. said its fiscal third-quarter profit dropped 24% despite a nearly 58% increase in sales.

Detroit-based Burroughs said its second-quarter profit rose to $57.3 million, or $1.26 a share, from $42.6 million, or $1.01 a share, during the comparable period a year earlier. Revenue rose 18.3% to $1.23 billion from $1.04 billion.

Honeywell said its second-quarter profit increased to $74.3 million, or $1.59 a share, from $58.7 million, or $1.29 a share, a year earlier. Revenue rose 6.6% to $1.48 billion from $1.39 billion.

Edson Spencer, Honeywell's chairman and chief executive officer, attributed the company's performance in part to the growth in the U.S. economy.

NCR, of Dayton, Ohio, said its second-quarter profit rose to $76.2 million, or 73 cents a share, from $68.9 million, or 63 cents a share, a year ago. Revenue increased 7% to $998.8 million from $932.1 million a year earlier.

The company's per-share results reflect a 4:1 stock split last April 18, NCR said.

The company said it set a second-quarter record for incoming orders, but did not provide specific figures. It said improvements in U.S. orders exceeded those in international orders.

Apple Computer, based in Cupertino, Calif., said its profit for the fiscal third quarter fell to $18.3 million, or 30 cents a share, from $24.2 million, or 40 cents a share, a year ago. Revenue increased 58% to $422.1 million from the year-earlier figure of $267.3 million.

Apple's profit has been affected by heavy spending to market its Apple IIc portable computer and its Macintosh microcomputer, according to an Apple spokesman.

The company noted that, although profit was lower than the year-ago period, this is its third consecutive quarter of profit increases.

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Experts make it clear: Software legal issues unclear

CW AT NCC

By Mitch Betts
CW Washington Bureau

LAS VEGAS — Speakers at a session of the recent National Computer Conference here made it clear that the legal issues surrounding software liability, malpractice, copyright and licensing are not clear at all.

Computer technology is advancing faster than the nation's legal system can develop principles and standards for controversies arising from the technology, the legal experts said. "Law is a shadow that follows along behind what is happening," observed Steven Brower, an attorney with the Los Angeles law firm of Wood, Lucksinger & Epstein.

In the licensing of mass-marketed software, for example, "we're in a mess right now," according to E. Ric Giardina, general counsel for Micropro International Corp. in San Rafael, Calif. The problem, he said, is that software vendors technically only license their software to users, but users often believe they have purchased the software and are free to copy it.

This contradiction occurs because, historically, software was obtained by large DP operations for mainframe computers with a contract establishing the license terms. Now, with mass marketing of software diskettes for microcomputers, software vendors are using "shrink-wrap licensing" to act as that contract.

With shrink-wrap licensing, the buyer legally agrees to be a licensee and not to copy the software at the moment the buyer tears open the plastic wrapping on the product.

To handle the copying problem, the software industry will need to devise technical means to make illegal copying very difficult, and it will have to educate users that copying is illegal (except for archival copies) under existing federal laws.

Another murky area of computer law is the applicability of copyright, trade secret and patent laws to software, according to Robert S. Bramson, head of the computer law group at Schnader, Harrison, Segal and Lewis in Philadelphia. "There's a different set of rules for each . . . and it's not very clear," he said.

For example, Bramson noted, software can be copyrighted, and it also can be protected as a trade secret if it really is a secret, but algorithms — pure software — cannot be patented.

Bramson also stated that when a company employee writes software, the employer owns the copyrighted work, but if a consultant writes the software, the consultant owns the copyright. "Sometimes it isn't clear whether a person is an employee or a consultant," he added.

Steven Brower, the session leader and a former programmer, discussed the legal aspects of programmer malpractice. He stressed that although the contract between a software vendor and a user may limit liability for software errors, that contract does not cover third parties affected by the software.

For example, he said, a hospital patient harmed by a faulty hospital data base could sue the programmer, and an injured subway rider could sue the programmer of the subway's traffic computer in the event of an accident.

Because of this liability problem, insurance companies have begun to offer insurance policies for software vendors and their programmers and for data processing operations, reported Marr T. Haack, product manager of electronic and information technology industries at St. Paul Marine Insurance Co. in St. Paul, Minn.

IBM backs down from third-party disclosure policy

By Bryan Wilkins
CW Washington Bureau

RYE BROOK, N.Y. — In a compromise between the giant and the little guys, IBM said last week that it will not insist on knowing the identities of end users of its systems either sold or leased by various independent dealers.

In exchange for this concession, the feisty independent dealers and lessors have agreed to sign a certificate acknowledging IBM's policy of discounting systems and equipment to the company's value-added resellers.

Spokesmen within the independent leasing industry predicted that the IBM action will make a greater supply of equipment for lease available to users, as the lessors will be more inclined to make volume purchases of IBM computers and peripherals.

Threat of court action

The Computer Dealers and Lessors Association (CDLA) earlier had threatened to take IBM to court [CW, March 19] over Big Blue's newly instituted policy of requiring end-user certification.

The association charged that IBM's end-user certification policy would give away crucial sales information to IBM before the deals had been completed by the independent resellers.

"We battled the problem and got a solution, and we are thrilled to death," commented CDLA President Richard A. Forsythe, the chief executive of Forsythe/McArthur Associates in Chicago, the largest private-leasing computer company in the country.

With the IBM policy of requiring end-user certification now eliminated, according to CDLA Executive Director James Benton, lessors and resellers will now only have to sign an alternative certification document with Big Blue, which incorporates computers and peripherals equipment.

Alternative program

In the new, alternative certification program, a lessor or reseller of IBM systems will pledge that the lessor or reseller is not in competition with designated IBM value-added remarketers.

A list of IBM machines not considered eligible for resale by independents and not included in the alternative certification program was released by IBM after extensive negotiations with the CDLA representatives.

However, IBM has retained its end-user certification program for all other purchasers or lessors of its equipment.

Certifications must be signed if, for example, the purchaser wants to qualify for any financial credit for leasing from IBM's subsidiary, IBM Credit Corp., or to satisfy a requirement for acceptable financing certification, according to CDLA's executive director.

"We got 95% of the equipment that we wanted," Forsythe said. The CDLA president added that the equipment that still qualified for the end-user certification program is equipment that is not in great demand by CDLA members, who are inclined to keep sizable inventories of tape drives, communications controllers and other peripheral IBM equipment.

The list of equipment not covered under the alternative certification program includes the IBM 30 series, 4341s and terminal equipment, such as models equivalent to the 3270 type, as well as printers and typewriters.

IBM move a concession

Robert Djurdjevic, an independent industry analyst who tracks the leasing market, called the IBM move a concession to lessors and independent dealers.

Djurdjevic, editor of the Phoenix-based *Annex Report*, said that IBM may have been prompted to make the concession since the case made by the CDLA was "one of the easiest issues to establish an antitrust claim on the part of IBM."

IBM had no comments on the changes in the certification of end-user policy when it was announced last week.

CDLA members comprise a large portion of IBM sales in the U.S. This portion is estimated at approximately $6 billion, or 40% of the DP hardware sold by IBM in the U.S. annually.

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NEWS

System to track athletic results at Summer Games

By Paul Korzeniowski
CW Staff

LOS ANGELES — The eyes of the world will be focused here later this week as sports enthusiasts await the results of 7,000 athletic events that make up the Summer Games of the 23rd Olympiad.

An elaborate computer system has been designed to ensure that the results of those 7,000 events are passed within 10 minutes to 10,000 news media representatives from 150 countries.

The Olympic Results System, which has been in the planning stages since May 1982, represents the combined efforts of the Los Angeles Olympic Organizing Committee, Ernst & Whinney , IBM, AT&T, McDonnell Douglas Automation Co. and approximately 600 volunteers.

Software driving the system was designed by DMR Associates, a Canadian consulting firm, and was used at the 21st Olympiad in Montreal and the last Olympiad in Moscow.

Volunteers check forms

As official entry forms trickled into Olympic headquarters earlier this month, the volunteers' work began in earnest, according to Dwight W. Catherwood, Ernst & Whinney's Olympic project manager.

"We estimate there will be 8,500 athletes competing in the Games," Catherwood said. "Ensuring that they are registered properly and their names are spelled correctly is our major concern. At the Winter Games in Sarajevo, Yugoslavia, officials estimated that 60% of the names were incorrectly spelled. We would not be satisfied with a similar performance."

After registrations are coordinated with prospective events, Catherwood stated, hard-copy seeding and scheduling information will be available to athletes and the media at four points: a central press center, event locations, an International Broadcast Center and International Olympic Committee headquarters. Catherwood estimated that 9 million copies of the information will be produced, primarily by Xerox Corp. 8700 laser printers.

Part of the computer system designed to track athletic results at this year's 23rd Olympiad to be held later this week in Los Angeles.

How it'll work

Volunteers with IBM 3178 terminals and 3287 printers will be stationed at 26 event sites, according to Catherwood. When an event's outcome has been determined, an Olympic official will hand a score sheet to the volunteer who will then feed the results interactively into an IBM 4381 mainframe located in McDonnell Douglas' Long Beach, Calif., facility.

The system will then produce on the 3287 a printout of the results, which the official will verify, Catherwood stated. Photocopies of the outcomes will be handed to media representatives attending the event.

Because the 26 sites are spread from northern to southern California, some reporters may be unable to attend certain events, Catherwood noted.

An electronic mail system, designed by AT&T, will reportedly allow journalists to query the 4381 for results of completed events, Catherwood said.

The Games' sprawling configuration presented logistical problems to Catherwood's group as well as to reporters.

"There wasn't any cable in these locations, so determining where and how to lay it required a great deal of time," he said.

Politics also hindered the system's implementation. "Event officials rule each event," Catherwood said. "Some do not allow terminals near the field of play. We had to confer with each event's officials and determine what they would permit. At certain events, volunteers and the computer equipment will be placed outside the field of play."

In addition to its basic features, the Olympic Results System will be interfaced to the United Press International, Associated Press and Reuters news wire services and a phototypesetting system designed to produce a daily newspaper at the Games.

Eliminating downtime

Eliminating downtime is a goal of most computer systems, and the Olympic Results System is no different.

Olympic Results System is no different.

"We have redundant processors and communication lines, so if there is a problem with the system, we can instantly switch to the backup system," Catherwood said.

But the results system does possess one distinct feature. "It's the only system I know of with a life cycle that lasts only 14 days," Catherwood said.

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NEWS

IBM airs strong second-quarter profits, sales

ARMONK, N.Y. — IBM, in the second quarter ended June 30, reported continued strong performance in profits and revenues and in the continued strategic trend toward direct purchases of equipment at the expense of rentals.

For the three months, IBM reported revenues of $11.1 billion from sales, rentals and services, compared with $9.5 billion for the comparable quarter a year earlier. Profits for the quarter were $1.6 billion, or $2.65 per share, up 20.8% from the year-earlier profits of $1.3 billion, or $2.22 per share.

In the first half of fiscal year 1984, IBM experienced revenues of $20.7 billion, compared with $17.8 billion in the year-earlier period. Profits for the first six months were $2.8 billion, or $4.62 per share, up 21.8% over the year-earlier profits of $2.3 billion, or $3.84 per share.

Revenues from rentals have declined more than 26% for both the second quarter and the first six months of the fiscal year. Revenues from outright sales, however, were $7.09 billion for the first quarter, a 32.2% increase over the year-earlier quarter; for the first six months, sales revenues were $9.5 billion, or 34.9% ahead of the comparable period in 1983.

The company continued to experience healthy increases in revenues from services, climbing to $2.3 billion for the quarter, compared with $1.8 billion a year earlier, and $4.5 billion for the first six months, compared with $3.5 billion a year earlier.

IBM Chairman John R. Opel said acceptance of new products remained high in the first quarter and, "We continue to realize significant improvement in expense-to-gross-income relationships, which reflect further improvements in our productivity." Orders continued to grow at a strong pace in comparison with 1983, Opel said.

Naisbitt, Nader to address meet

HOUSTON — John Naisbitt, author of the best-seller *Megatrends*, and Ralph Nader, consumer advocate, will highlight a one-day executive seminar on Sept. 19 during the Genesys Software Systems Annual Users Conference '84.

The conference, being held from Sept. 18-20 at the Hyatt Regency Hotel here, will focus on "Human Resource Management: The Integration Issue." The seminar will address the issue of cost containment in human resource management.

The registration fee for the seminar is $295, and $525 for the conference, with discounts for multiple attendees from the same company. Registration for both the seminar and the conference together is $675, the sponsor said.

More information is available from Genesys Software Systems, Inc., 20 Ballard Way, Lawrence, Mass. 01843.

DBMS stories sought for upcoming Special Report

Data base management systems (DBMS) are rapidly becoming the rage of the age. Coming in all shapes and sizes, from small to huge, from micro to mainframe, the DBMS is one of the most widely used information management tools. *Computerworld's* September Special Report will focus on DBMS and offer a taste of the available flavors.

The Special Report will look at the various kinds of DBMS, their power and their limitations. It will look at DBMS on mainframes and on micros and at data base machines and at how one fits or does not fit with the others.

The September Special Report will address such questions as: Is a DBMS really necessary? What new uses of DBMS are emerging? When should an installation consider using more than one DBMS? What are the advantages and disadvantages of running a DBMS on a separate machine?

Contributions to the Special Report should take one of two forms: a tutorial article, discussing an issue or trend, or an application story outlining a particular user firm's experience with a DBMS.

Articles must be typed, double-spaced and range in length from four to six pages. Artwork, such as charts, graphs and photographs, is welcome.

Authors should include a brief biography and a telephone number at which they can be reached.

The deadline for submissions to the Special Report is July 30. If you have a story you would like to tell or any questions to ask, send them to Donovan White, Special Reports Editor, *Computerworld*, 375 Cochituate Road, Box 880, Framingham, Mass. 01701.

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Calif. police redesign micro into multiuser system

By Edward Warner
CW Staff

SACRAMENTO, Calif. — The California State Police headquarters here has implemented a cost-conscious solution to its need for desktop computing power. Able to afford only one IBM Personal Computer XT, the agency configured that computer into a multiuser system supporting 14 terminals.

The terminals provide word processing and filing functions for the agency and will eventually be able to access a copy of the state police's criminal data base, when a 70M-byte hard disk storage unit is added to the system soon. In all, said Schnoer Sherman, the man who configured the system, it provides $25,000 worth of processing power, based on the cost of using personal computers instead of terminals.

The system cost the agency $18,000, including the host.

The key to the four-month-old system's multiuser capabilities is its QNX operating system, one which Sherman described as being outwardly like the Unix operating system, but inwardly different. QNX, from Quantum Software, Ltd., of Canada, cost the agency $650 and came equipped with built-in word processing, file management and communications software, said Sherman, the agency's DP coordinator and staff services analyst.

"This is the best single piece of software I've ever seen in my life," Sherman enthused.

The operating system's built-in communications software, in conjunction with the multiuser system's three modems, allows the system to communicate with terminals in use at the agency's command centers in Los Angeles, San Francisco, Fresno, Calif., and elsewhere in Sacramento.

When the 70M-byte hard disk is installed, Sherman added, the system will download the state police data base on wanted suspects from the state's Teale Data Center. The agency currently accesses that data base online, but experiences slowed data retrieval that in-house storage of a data base copy would solve, he said.

The agency's system has four Tab Products, Inc. 132/15 terminals and six Teleray Trend Data Corp. terminals hard-wired to 10 of 16 ports available on the XT. Sixteen ports on an XT? It is possible, Sherman explained, through the addition of two eight-port serial cards from Control Systems Corp. and a 16-port bracket on the back of the computer.

The state police bought the Teleray terminals, which had been leased by other California state agencies, by paying off the $160 "balloon" at the end of each terminal's lease period. Sherman said he replaced the Teleray terminals' black-and-white screens with amber screens to ease viewing during word processing, a function that he said occupies at least six people in his office at any one time.

Though the system is only four months old, Sherman said most of the office's paperwork is already being done on it, and several files in a personnel data base have been stored on the system.

Sherman said the biggest hang-up with a multiuser system based on an IBM Personal Computer XT is its storage demands. To remedy that hang-up, the Personal Computer XT's 10M-byte hard disk storage unit capacity will soon be augmented by a Tallgrass Technologies Corp. 70M-byte disk.

Sherman said two other state agencies have sent representatives to look at the state police multiuser system and that, were the QNX software used in conjunction with a group of Teleray terminals and an IBM Personal Computer host, state agencies could have a multiuser system for less than $15,000.

ASM to offer certification

TORONTO — At its 37th Annual Conference held recently here, the Association for Systems Management (ASM) announced the inauguration of a Certified Systems Professional (CSP) Program, which will encompass periodic recertification through continuing education and require practitioners to keep abreast of rapidly changing systems technology.

The CSP program is open to all qualified systems personnel, regardless of association affiliation. The purpose of the program is to identify systems personnel who have attained a specified level of knowledge and experience in the principles and practices of systems, information resource management and related disciplines; and to foster continuing professional development.

According to the association, the certification program will help define and develop standards of knowledge and conduct for systems professionals, identify those who meet those standards and establish a continuing education program to maintain the CSP status.

Further information is available from the CSP Certification Board, c/o ASM, 24587 Bagley Road, Cleveland, Ohio 44138.

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NEWS

Computer system fails to pay off for N.J. lottery

TRENTON, N.J. — New Jersey Pick-Six Lotto players, hoping to hit the $1.75 million jackpot, found to their horror earlier this month that no one knew if they had won. "The computer is down" — the four most maddening words in modern America — was all they got in place of their winnings.

Tony Batista, director of operations for the New Jersey state lottery commission, said an as-yet-unidentified snag occurred after the lottery had shut down its two computer systems for the day on July 12.

Both the main system and the backup, provided by the American Totalizer Division (Am-Tot) of General Instrument Corp., failed to purge the losers' files and save the winners'.

As a consequence, the lottery could not cash any winning tickets for over 24 hours.

"We've had a series of different and significant problems over the past four weeks," Batista said, revealing that the Am-Tot network system had crashed 39 times during the lottery's 16-hour on-line day June 14. Batista said the vendor had yet to explain those failures as well. "They have yet to figure out if the hardware has gone flaky, or if it's a software bug that's just now coming to the surface after four years," he said.

The computer failures cost the state lottery money, Batista said, "but how much is an intangible. If you're a winner, you usually pump some of the money right back into the system. You feel lucky. If this [the computer failure] happens often enough, we may turn off some players. 'I win,' they'll say, 'but I can't cash.' "

Dissatisfied with the service provided by Am-Tot to the state's 3,500 storefront terminals, New Jersey evaluated a number of alternate vendors late last year and awarded a contract to convert its system to hardware and software from Gtech Corp. of Providence, R.I. The recent flurry of computer headaches did not influence the state's decision to switch vendors, "but they do make it look like we made an even better choice," he said.

Batista said the conversion would take several months, although the lottery commission was seeking to accelerate the process. In the meantime, Am-Tot will continue to provide service on the state's lottery system.

"They've been cooperative, but it's hard to say if they would try any harder if they were keeping the contract," Batista said.

Asked what the lottery commission could do to minimize its computer failures, Batista replied, "There's not a whole lot we can do." The commission is demanding that Am-Tot have a programmer and field engineer on-site in New Jersey instead of summoning them from its base in Hunt Valley, Md.

Repeated calls to John Kirkland, Am-Tot's director of lottery operations, asking for comment, were not returned by press time.

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Exec journal introduced

PENNSAUKEN, N.J. — Auerbach Publishers, Inc. here has introduced a new quarterly publication, *Information Strategy: The Executive's Journal*, edited by Alan D. Mazursky, a senior consultant with Deloitte, Haskins & Sells.

The journal is aimed at aiding executives in making policy and strategy decisions about their organization's information technology.

The publication targets chief executive officers, chief operating officers, chief financial officers, presidents and vice-presidents.

It is available for an introductory price of $65.

More information is available from Auerbach Publishers, 6560 N. Park Drive, Pennsauken, N.J. 08109.

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W9923 Service Level Management

A 3-day course. Dallas: Sept. 11. Chicago: July 24. New York: Oct. 16. Tuition: $990. In this course, I/S managers and financial professionals explore the process of planning, budgeting, and allocating I/S resources to deliver quality computing services to end users.

W9941 Service Level Agreement *NEW COURSE*

A 2½-day course. Dallas: Sept. 25. Boston: Oct. 30. New York: Aug. 7. Tuition: $700. This workshop helps you establish and maintain a service level agreement between I/S and the user community. It provides ideas for defining quality service and documentation used within an effective Service Level Management program.

W9916 Managing Data Communications Systems

A 3½-day course. Chicago: Oct. 9. San Francisco: July 24. New York: Sept. 11. Tuition: $735. Having your people learn quality service-oriented management techniques can provide greater user satisfaction and higher availability. Network service managers and DP operations or technical support managers will learn how to assess and improve their data communications services. A must for online systems or network control managers.

W9927 DP Operations Management

A 3½-day course. New York: July 31, Aug. 27, Oct. 9 or Dec. 4. Boston: Sept. 25. Chicago: July 24, Aug. 21, Sept. 18, Oct. 16, Nov. 13 or Dec. 11. Atlanta: Oct. 30 or Dec. 11. Kansas City: Aug. 7. Houston: Sept. 25. San Francisco: Nov. 6 or Dec. 4. Philadelphia: Oct. 30. Los Angeles: Dec. 4. Tuition: $750. We'll teach operations managers techniques of effective management within the DP operations and services. The goal is to gain a greater understanding of the people issues, as well as to improve operational productivity.

W9918 Operations Analysis and Management Controls

A 3½-day course. Dallas: Oct. 23. Minneapolis: July 31. San Francisco: Nov. 13. Los Angeles: Oct. 2. Tuition: $790. Experienced operations managers and senior staff should attend to learn advanced topics in operations control and availability management techniques. Improving end-user satisfaction and operations efficiency is our aim.

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NEWS

Computer professionals in high demand at job fair

CW AT NCC

By Kathleen Sullivan
CW West Coast Bureau

LAS VEGAS — It's a seller's market. That was the sentiment expressed by many recruiters who held court at the Tech Fair, a recruiting forum held in conjunction with the recent National Computer Conference here recently.

Computer professionals of all kinds — from entry-level to senior staff — are in high demand, according to an informal survey of participants at the Tech Fair, where more than 40 companies set up booths.

"We're looking for computer science graduates and computer engineers, everyone from entry-level to senior-level," said Ronald Olson, staff assistant at IBM's General Products Division. "On this trip, we're specifically looking for electrical engineers for our research laboratory," he added.

The competition for new employees is more intense this year because "many more companies are hiring," Olson said. A typical student, for example, will receive four or five job offers this year, as compared with only one or two in 1983, Olson said.

Bob Corbin, employment supervisor for Digital Equipment Corp.'s field headquarters group in Stow, Mass., said the company was in the market for hardware and software designers as well as for MIS professionals.

"We're looking for everyone from programmers through senior managers," Corbin said.

In the MIS department, the company is seeking individuals who can combine technical skills with interpersonal skills, Corbin said. According to Corbin, an individual with a "well-rounded" technical background as well as "people skills" is hard to find.

"Technical people are good at talking to machines," he said. "But communicating with people is another thing."

Scott Donnelly, senior human resource representative for Apollo Computer, Inc., a Massachusetts-based firm, said his company was looking for hardware and software engineering professionals, with a major emphasis on operating systems, graphics, CPU development and networking hardware.

Donnelly said that since the technology itself was very new, the demand for people with skills applicable to the workstation market was terrific.

"It's hard to find individuals with a significant number of years of experience in the market," he said.

Jane Eden, section head of software engineering for Harris Corp.'s Government Information Systems Division, said Harris hoped to find experienced design engineers at the Tech Fair.

"We need individuals with two to five years of experience in real-time software design, digital design or systems engineering," she said.

Paul Bjerke, employment representative for Sperry Corp.'s Computer Systems Division in Minneapolis, said his division was trying to recruit hardware and software design engineers at the Tech Fair. According to Bjerke, the specialized skills required for some jobs meant that the jobs were hard to fill.

ITI meet set for Sept. in Washington, D.C.

NEW YORK — The Institute for Technology Integration (ITI) will hold its Second Annual Conference on Administration and Control of Data Bases at the Marriott Crystal City Hotel in Washington, D.C., from Sept. 17-19.

The ITI conference will feature a comprehensive curriculum that will deal with planning, implementing, usage and administration of data bases in government, business and general industry.

Featured speakers will discuss the future direction of data administration, the impact of enterprise modelling on business information systems and management/technical issues in data administration/data base administrator functions.

Registration costs $695 for individuals; additional individuals from the same company may register for $575.

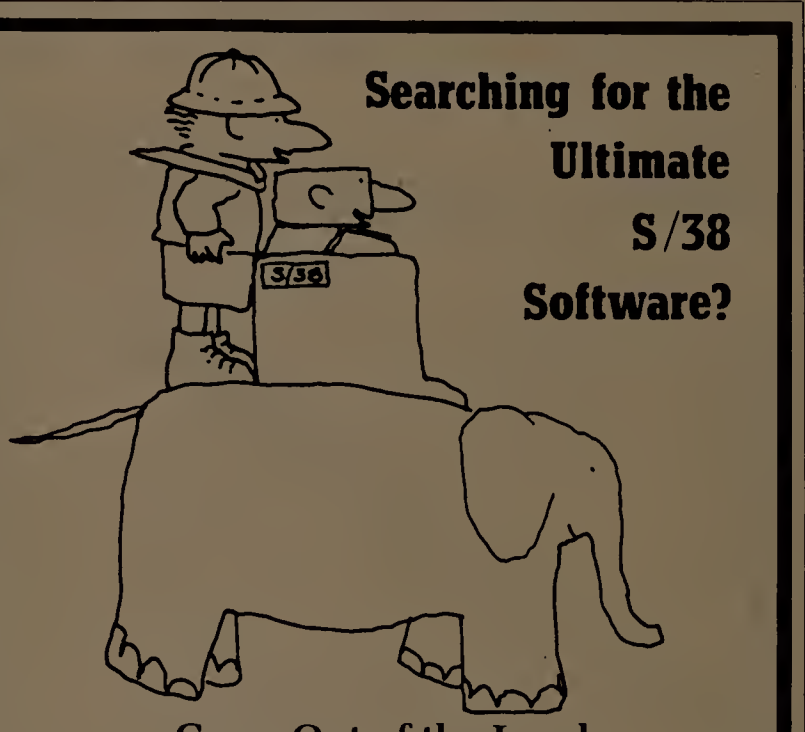
Additional information can be received from the ITI Conference Registration Department, 6th Floor, 1450 Broadway, New York, N.Y., 10018.

DBMS users meet scheduled

SAN ANTONIO — The Fifth Annual System 1022/1032 Users Conference will be held here Oct. 1-4. Topics will include integrating software among Digital Equipment Corp. hardware lines, interfacing mainframe software with microcomputers and data base design.

System 1022 and 1032 are data base management systems that were designed for Decsystem-10s and -20s, as well as VAX models, by Software House, Inc., a Cambridge, Mass.-based firm.

Registration costs $165 before Sept. 1 and $185 thereafter. Group rates are available from Ellen Boland, Software House, 1105 Mass. Ave., Cambridge, Mass. 02138.



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Better workstations, stable costs projected through '85

CW AT NCC

By Kathleen Sullivan
CW West Coast Bureau

LAS VEGAS — While the prices of workstations will remain stable through 1985, users will reap the benefits of increased functionality — in memory, processors, storage and displays — for the same price. That was the assessment made by Amy Wohl, an analyst with Advanced Office Concepts Corp., who addressed a National Computer Conference session here recently on "State of the Art in Office Automation."

Wohl made a series of specific predictions, looking ahead to the state of the OA market in 1986 and 1996.

According to Wohl, the average workstation costs between $5,000 and $6,000. At present, the typical workstation is a 16-bit system, with 256K to 512K bytes of memory and a monochrome display. Although most present systems are generally floppy disk-based, an increasing number of users are installing 10M-byte hard disks.

By 1986, Wohl said, workstations will feature increased functionality at all levels. They will be built around 32-bit processors and will include 512K bytes to 1M byte of memory. Bit-mapped displays and color displays will make their appearance in the office by 1986, Wohl predicted. Users will no longer be satisfied with floppy disk systems, and instead, each workstation will have a 10M-byte hard disk.

Integrated software will play a more important role in the office within two years, Wohl said. Workstations will no longer be used in a standalone mode in 1986, she added. Instead, they will be used in a "semimanual partitioned mode," where workstations will be able to communicate with the bigger systems in the office.

By 1996, the look of the typical workstation will have changed dramatically, Wohl predicted. By then, workstations will feature between 2M and 5M bytes of memory in a system designed around a 64-bit processor.

Displays will also feature increased functionality, Wohl said. In addition to bit-mapped and color displays, users will see the introduction of high-resolution, flat panel displays in the office environment. The typical workstation in 1996 will include a 10M- to 50M-byte hard disk, Wohl said.

By 1996, users will be able to "self-customize" user interfaces as well as the particular functions of the workstation through the use of software that incorporates artificial intelligence and expert systems, Wohl said.

Finally, Wohl said, workstations will operate in a "seamless partitioned" mode, where communications at all levels will be completely transparent to users.

What companies will be the major players in the office automation market? At present, the market is dominated by IBM, Digital Equipment Corp., Wang Laboratories, Inc. and, to a lesser extent, by Data General Corp. and Hewlett-Packard Co., Wohl said.

By 1996, however, only IBM, DEC and Wang will remain from the original lineup. They will be joined by AT&T, working in conjunction with one of its regional operating companies.

In addition, the market will see the emergence of a Japanese-American partnership, Wohl said. A Japanese firm will design a system that will be sold through the distribution channels of a U.S. company, she said.

Speed overemphasized, managers told

CW AT NCC

LAS VEGAS — It came as something of a shock to DP managers at the recently held National Computer Conference here when they were told that "faster is not necessarily better" when it comes to distributing DP information to business executives.

Though DP managers view speedy distribution of executive reports via telecommunications as axiomatic, the speed factor may be too costly or unnecessary, James P. McCloskey said.

McCloskey, vice-president and treasurer of Sybron Corp., based in Rochester, N.Y., recommended that DP managers periodically ask executives how fast they need the information.

Speaking at a conference work session, McCloskey stressed that a good information distribution system will provide business managers at all levels — factory, mid-level management and senior management — with the information they need to take business actions and spot problems.

"It is expected that management action will be taken in response to the data," he said. The level of detail in the reports should diminish as it rises to senior management, he added, so that each manager gets exactly the information needed.

McCloskey said an organized distribution system is crucial for his firm, which is a highly decentralized and international medical services company. "Sybron was able to go from centralized to decentralized [management] due to the distributed financial reporting system," he said.

Senior management looks at a summary of the key financial indicators for the corporation to aid in performance evaluation, determining capital requirements and identification of trouble spots, he said. In addition, the distribution system helps Sybron to assimilate newly acquired companies.

Charles C. Cook, another speaker at the same session, noted that there are three ways to share data bases: electronic transfer, diskette transfer or human keyboarding for small, complex data bases.

Cook, president of the Systems Division of Cole-Layer-Trumble Co. of Dayton, Ohio, warned DP managers and executives not to wait for the development of perfected local-area networks to handle data sharing. DP managers, he said, need to tackle the problem of sharing incompatible data bases quickly, using short-term solutions.

Cook asserted that DP managers should devise a system so that users can accomplish downloading, uploading and cross-loading by transferring simple, flat files of fixed record length using a generic program.

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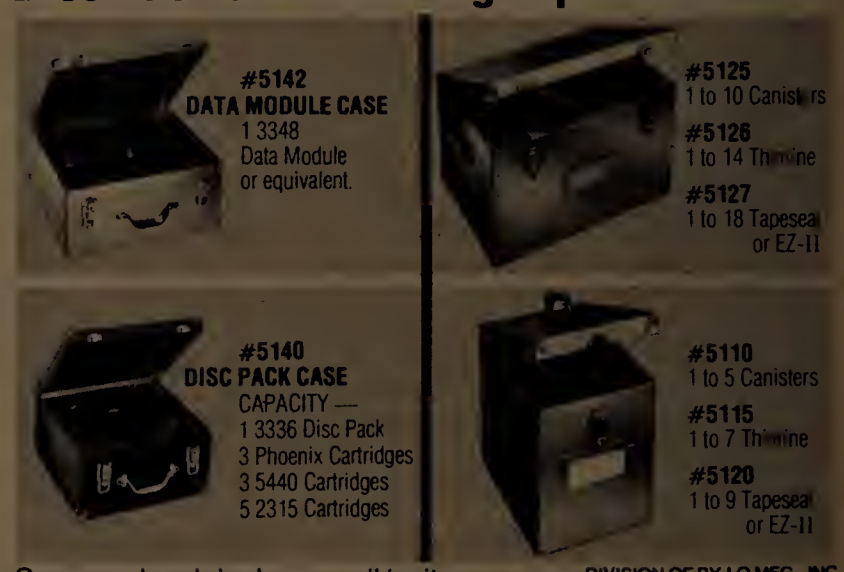

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NEWS

Speakers address emerging trends in electronic mail

CW AT NCC

By James Connolly
CW Staff

LAS VEGAS — Alternative delivery methods, new applications, integration of text with voice and images and the use of personal computers to exchange messages are among the trends in electronic mail, attendees at a session of the National Computer Conference were told here recently.

Speakers at a panel session, titled "Electronic Mail — Current Developments," asserted that electronic mail will work for most businesses and that the electronic mail system of the future should process text, voice messages and images.

"I began using electronic mail in 1976. It worked well then and it works well today. Electronic mail is a dynamic, changing industry. It is essential to office automation and can solve many of your problems," said Walter E. Ulrich, president of Walter E. Ulrich Consulting of Houston.

Ulrich cited four trends that have appeared in the electronic mail field during the past year.

Alternative methods of delivery allow electronic mail users to send electronic messages to recipients who have the proper equipment and written messages to others. He noted that new services electronically transmit messages across the U.S. to dispatch centers where the messages are printed and hand-delivered within two hours.

Applications in electronic mail permit an organization to track transactions such as sales and orders and to relay the reports to remote offices, he added.

Integration means giving the user the option of leaving a verbal message instead of a typed message or the opportunity to attach documents such as contracts or graphs to messages, he said.

The fourth trend, according to Ulrich, is toward the use of personal computers for accessing electronic mail systems. Ulrich said that 60% of new electronic mail users last year utilized personal computers as workstations.

Robert Georges, managing director of Rising Star Industries, Inc. of Torrance, Calif., told NCC attendees that his company has relied on electronic mail since the company's inception two years ago, with a personal computer-based system linking software development specialists who operate from homes and offices throughout the U.S.

Georges, whose system is tied together through electronic bulletin boards, noted that use of electronic mail since the company's founding not only has facilitated communications, but has let the firm build a filing system with the memos and messages taken from electronic mail.

Michael Ludlow, vice-president of marketing for Digital Sound Corp. of Santa Barbara, Calif., a manufacturer of a voice-based message system, outlined some of the differences between voice and text message systems.

Ludlow claimed that the advantages of voice messaging include economy, as it eliminates telephone tag when three out of four business calls fail to reach their target party; accessibility, as it can be used with new technologies such as cellular telephones; productivity, as it reduces interruptions; and 24-hour availability.

Ludlow said that within 18 months, integrated message systems where voice and text complement each other will be generally available.

Comparing the two media, Ludlow said voice messaging is better suited for short, personal messages, while text is better for longer messages or communications that may require a paper record for legal reasons.

In addition, text allows easy scanning of messages for key points, data extraction, message reuse and conversion of text into voice, Ludlow said.

Communications meet set for Oct.

ARLINGTON, Va. — The Telecommunications Conference Center, a division of Energy Bureau, Inc., will sponsor a conference titled "New Business Opportunities in Telecommunications," aimed at marketing, planning and financial executives involved in the industry, on Oct. 22 and 23 at the Sheraton Crystal City here.

Among the topics to be covered include current and emerging needs of business and residential customers, regulatory impacts on new ventures, divested Bell operating company plans and ventures and how to determine market attractiveness of new ventures.

Registration for the conference is $695, the sponsor said.

More information is available from Carol A. Hertzoff, Assistant Vice-President, Telecommunications Conference Center, 41 E. 42nd St., N.Y., N.Y. 10017.

NEWS

INTERNATIONAL REPORT
CW International News Network

AUSTRALIA

CANBERRA — Plans are under way to establish the Canberra Technology Park — the brainchild of Hewlett-Packard Australia Ltd. and the Australian construction firm Lend Lease. The multimillion-dollar center will reside on a 37-acre site that had been set aside by the Australian National Commission for high-technology development some years ago. Lend Lease has 10 years to complete this project, sources said.

■

SYDNEY — The New South Wales Department of Technical and Further Education, a group of 19 technical colleges here, intends to install networks of microcomputers in all its colleges by the end of 1987.

Each standard computer classroom will have 16 networked micros; about 1,000 micros in all are involved in the system. Requests for tenders closed last month on the initial phase of the project, estimated to be worth $2.2 million.

■

SYDNEY — A group of venture capitalists led by Citicorp Capital Investors Australia Ltd. has injected $3 million into Systems Technology Pty. Ltd., designer and manufacturer of the ST3702 Systems Network Architecture protocol converter. Systems Technology has also struck a deal with an as-yet-unnamed U.S. manufacturer of communications equipment. Other partners in the investment include Citicorp Venture Capital Ltd., Morgan Holland Ventures and Accell Corp., a U.S. firm. The $3.5 million (Australian) represents 38% of the paid-up capital of Systems Technology, subscribed to by the management and original founders.

JAPAN

TOKYO — Fujitsu Ltd. has unveiled the Facom A, a Lisp-based computer developed by Tokyo University for use in artificial intelligence. This new machine is a back-end processor that connects with the company's M series mainframes and S-3000 series of superminicomputers, allowing users to utilize the data base and Japanese word processing functions of M series and S-3000 series.

Fujitsu claims the Facom A is one of the fastest Lisp-based machines available because of an architecture that incorporates a hardware stack of high-speed memory, high-speed recognition of data items and a high-function compiler.

Main specifications of the machine include a 16-nsec machine cycle time, a hardware stack of 8K words (32-bit words), 16M bytes of virtual storage and 8M bytes of real storage and a data transmission speed of 1M byte/sec. Facom A, which will be available at the end of March 1985, costs approximately $110,000. A Facom A/S-3300 system costs approximately $264,000. Fujitsu expects to sell 200 systems in three years.

■

TOKYO — A high-density optical disk based on polycarbonate has been developed here by Daicel Chemical Industries, Ltd. The company will begin construction in August of a new manufacturing plant that will mass-produce the disk at a cost of $160 to $200. Plant construction is due for completion in mid-1985, after which the disks will be available.

UNITED KINGDOM

LONDON — The government's Alvey Research Program, which was established a year ago to help Britain compete in the world high-technology market, has approved three large-scale projects that will span five years and cost approximately $40 million. The projects involve automated design and production technology, a speech input system and a mobile information system, according to an Alvey spokesman.

■

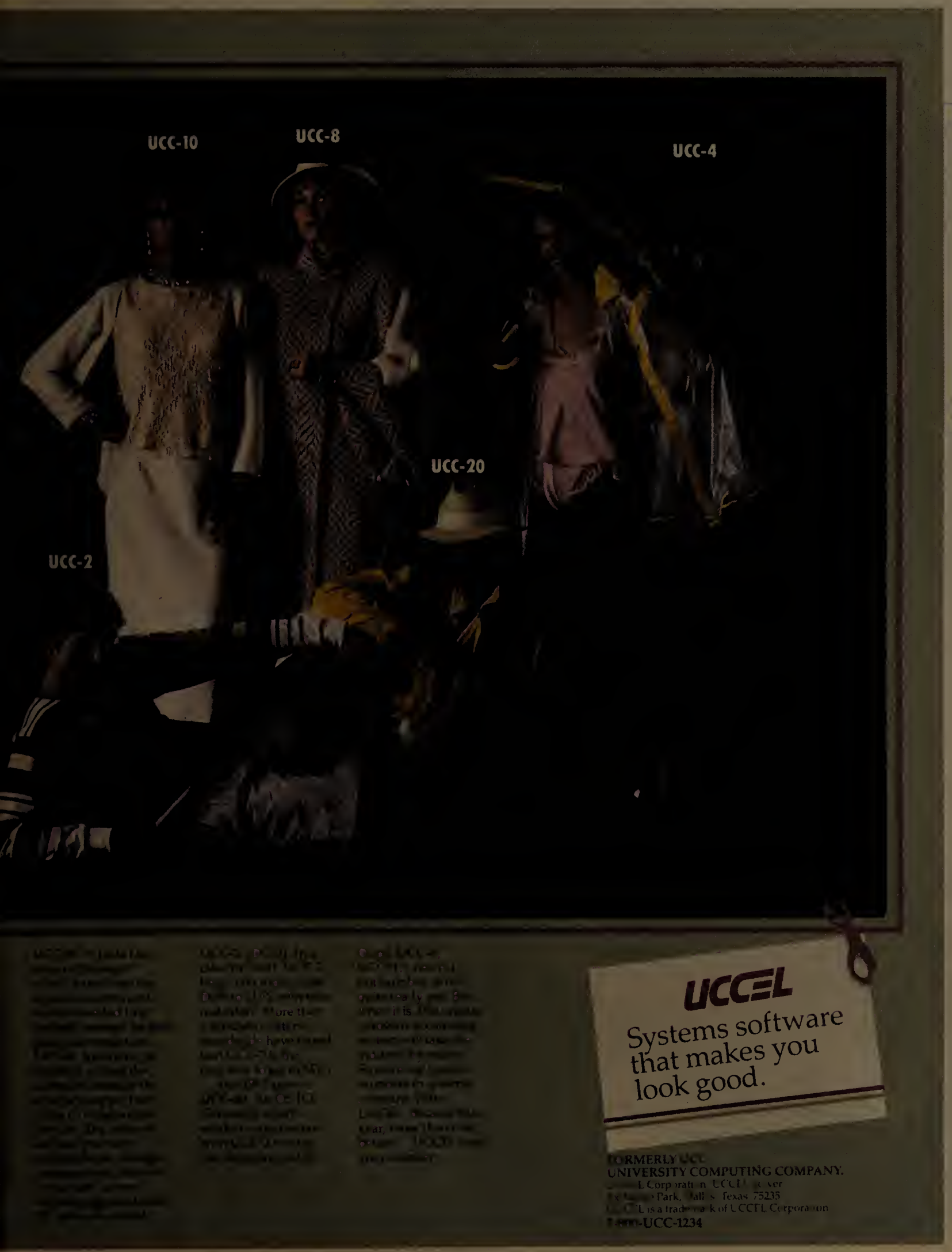
LONDON — A joint venture deal has been struck here between Racal Electronics PLC and Norsk Data A.S. to design computer systems with artificial intelligence for defense, engineering, education, finance and petrochemical applications. Racal-Norsk Ltd., as the new company is called, is expected to unveil its first product, the Knowledge Processing System 10, during the last quarter of 1985, a spokesman said.

■

COATSBRIDGE — An 825-lb, Scottish-made industrial robot will be unveiled in the U.S. later this month by the Scottish firm Lamberton Robotics. The robot was designed for oil production field work and can reportedly position high-temperature (1,200 degrees Celsius) devices, called billets, into a 30,000-ton forging press at the rate of 50 billet/min.

WEST GERMANY

MUNICH — The Share European Association (Seas) has attacked the European Economic Community's (EEC) position in the IBM antitrust case. The users group pointed out to the EEC that IBM could react with actions that could hurt IBM users' interests. To prove that point, Seas worked out a technically oriented point of view that differed from the committees's bureaucratic attitude. Hagen Hultzsch, chairman of the DP center of the "Gesell Schaft Fuer Schwerionenforschung" (GSI) in Darmstadt, West Germany, handed over the complete correspondence of his organization with the committee to newspapers in Europe and the U.S.



NEWS

WEEK OF AUGUST 19

AUGUST 20-24, HOUSTON — **Structured Analysis & Design Techniques.** Contact: Elise Rabalais, Learmonth & Burchett Management Systems, Inc., Suite 405, 2800 N. Loop W., Houston, Texas 77092.

AUGUST 20-24, CHICAGO — **Advanced Structured Analysis.** Contact: Yourdon, Inc., 1133 Ave. of the Americas, New York, N.Y. 10036.

AUGUST 20-24, ENGLEWOOD CLIFFS, N.J. — **Net Performance Management.** Contact: Institute for Software Engineering, 510 Oakmead Pkwy., Sunnyvale, Calif. 94086.

AUGUST 20-24, NEW YORK — **Vsam.** Contact: Sysed, Inc., One Park Ave., New York, N.Y. 10016.

AUGUST 20-24, CHICAGO — **IMS Data Base Design.** Contact: Sysed, Inc., One Park Ave., New York, N.Y. 10016.

AUGUST 21-23, MOUNT POCONO, PA. — **Strategy of Formulations Development.** Contact: Du Pont Statistical Seminars, Room X-40236, Wilmington, Del. 19898.

AUGUST 22-24, BOSTON — **Relational Data Bases.** Contact: Software Institute of America, Inc., 8 Windsor St., Andover, Mass. 01819. Also being held Aug. 27-29, Toronto.

AUGUST 22-24, LOS ANGELES — **VM/SP Structure, Flow & Tuning.** Contact: Goal Systems International, Inc., 5455 N. High St., Columbus, Ohio 43214.

WEEK OF AUGUST 26

AUGUST 26-30, BOSTON — **Information Center Conference & Exposition.** Contact: Loretta Wolman, Warren/Weingarten Publications, 38 Chauncy St., Boston, Mass. 02111.

AUGUST 27-28, LOS ANGELES — **Vsam OS & DOS Performance and Tuning.** Contact: Goal Systems International, Inc., 5455 N. High St., Columbus, Ohio 43214.

AUGUST 27-29, LOS ANGELES — **Information Center.** Contact: Software Institute of America, Inc., 8 Windsor St., Andover, Mass. 01810.

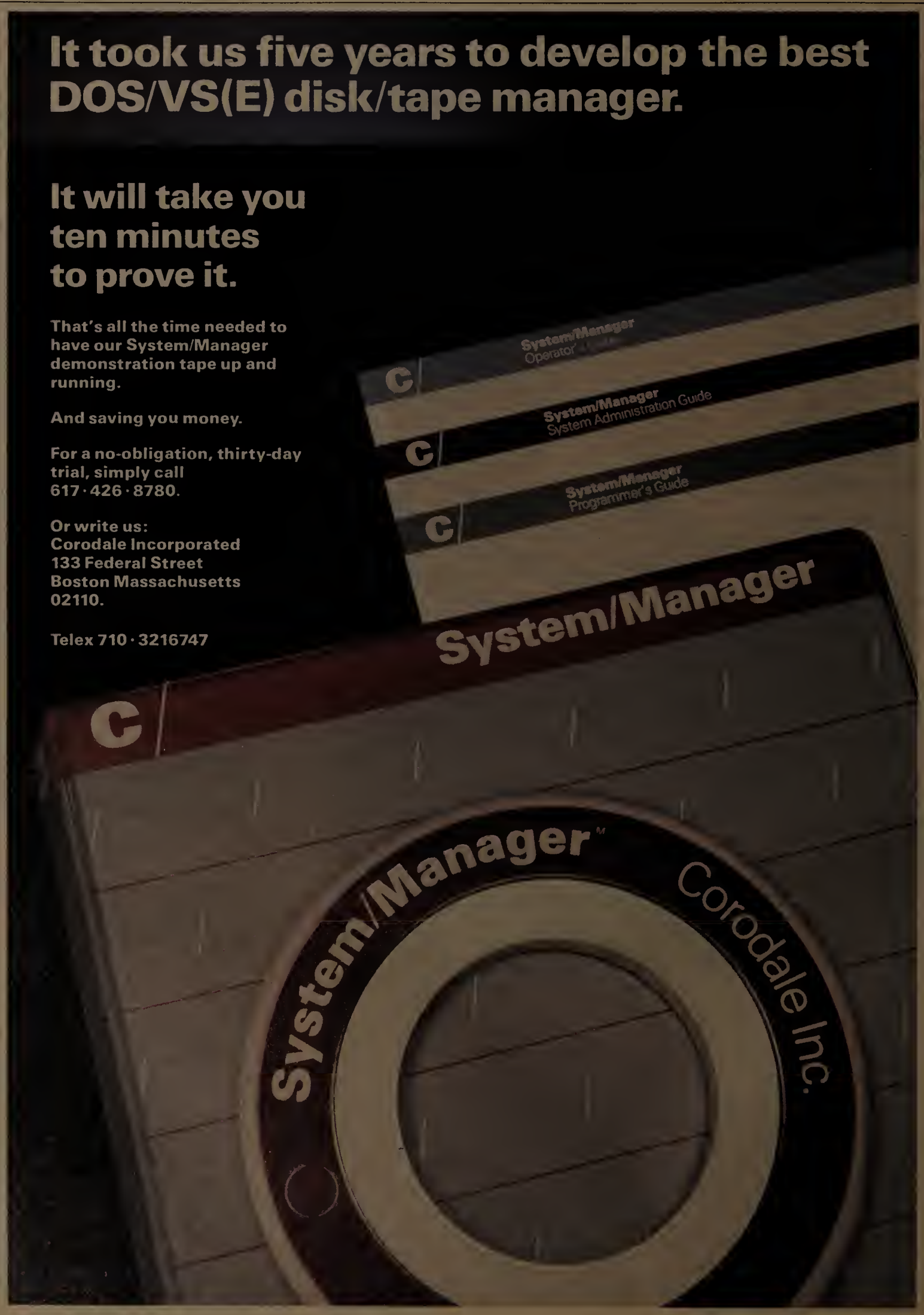
AUGUST 27-30, NEW YORK — **CICS Debugging.** Contact: Sysed, Inc., One Park Ave., New York, N.Y. 10016.

AUGUST 27-30, SAN DIEGO — **The 11th Annual North American Data General Users Group Conference.** Contact: Dolores Risi, Users Group Clerk, Data General Corp., 4400 Computer Drive, Westboro, Mass. 01580.

AUGUST 27-31, BOSTON — **Structured Design and Programming Workshop.** Contact: Yourdon, Inc., 1133 Ave. of the Americas, New York, N.Y. 10036.

AUGUST 27-31, SINGAPORE — **The 10th International Conference on Very Large Data Bases.** Contact: Dr. Gerald A. Wilson, Advanced Information & Decision Systems, 201 San Antonio Circle, Mountain View, Calif. 94040.

AUGUST 29-31, LOS ANGELES — **CICS/VS Internals for Systems Programmers.** Contact: Goal Systems International, Inc., 5455 N. High St., Columbus, Ohio 43214.



WEEK OF SEPTEMBER 2

SEPTEMBER 4-7, NEW YORK — **TSO ISPF.** Contact: Sysed, Inc., One Park Ave., New York, N.Y. 10016.

SEPTEMBER 4-7, NEW YORK — **CICS Application Design.** Contact: Sysed, Inc., One Park Ave., New York, N.Y. 10016. Also being held Sept. 10-13 in New York.

SEPTEMBER 5-7, WASHINGTON, D.C. — **Configuration Management of Software Programs.** Contact: George Washington University, Continuing Engineering Education, Washington, D.C. 20052.

SEPTEMBER 5-7, SAN JOSE, CALIF. — **Office Automation and the Technology Revolution.** Contact: Data-Tech Institute, 386 Franklin Ave., Nutley, N.J. 07110. Also being held Sept. 12-14 in Columbus, Ohio.

SEPTEMBER 5-7, CHICAGO — **Structured Analysis for Users.** Contact: Yourdon, Inc., 1133 Ave. of the Americas, New York, N.Y. 10036.

SEPTEMBER 5-7, NEW YORK — **Managing Projects in the Structured Environment.** Contact: Yourdon, Inc., 1133 Ave. of the Americas, New York, N.Y. 10036.

SEPTEMBER 5-7, ALBUQUERQUE, N.M. — **New Gateways to SNA.** Contact: Data-Tech Institute, 386 Franklin Ave., Nutley, N.J. 07110.

SEPTEMBER 5-7, TORONTO — **Capacity Management Forum.** Contact: Institute for Information Management, 510 Oakmead Pkwy., Sunnyvale, Calif. 94086.

SEPTEMBER 5-7, WASHINGTON, D.C. — **Artificial Intelligence.** Contact: Yourdon, Inc., 1133 Ave. of the Americas, New York, N.Y. 10036.

SEPTEMBER 6-7, SAN FRANCISCO — **Systematic Software Testing.** Contact: Yourdon, Inc., 1133 Ave. of the Americas, New York, N.Y. 10036.

SEPTEMBER 8-9, NEW YORK — **CICS Internal Architecture.** Contact: Sysed, Inc., One Park Ave., New York, N.Y. 10036.

WEEK OF SEPTEMBER 9

SEPTEMBER 10-11, HASBROUCK HEIGHTS, N.J. — **Supporting and Maintaining the Data Communications Network.** Contact: Data-Tech Institute, 386 Franklin Ave., Nutley, N.J. 07110.

SEPTEMBER 10-12, TORONTO — **The Second International Congress on Computer Security (IFIP/Sec '84).** Contact: IFIP/Sec '84, International Security Congress, 160 Duncan Mill Road, Don Mills, Ont., Canada M3B 1Z5.

"All the Data That's Fit to Transmit"

DDR Times

WEATHER: Sunny and mild for HYDRA II Users; elsewhere, acid rain and earthquakes.

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DIRECT CHANNEL-ATTACH PROTOCOL CONVERTER PROVIDES MICRO-TO-MAINFRAME LINK FOR ANY PC

SAN RAFAEL, Calif.—The only direct channel-attach protocol converter for VM, DOS, and MVS frees users from standardizing peripherals, the device's exclusive marketers, Diversified Data Resources, Inc. (DDR), said today.

The versatile Z8000-based HyDra II lets any PC or ASCII terminal with an RS-232C interface dial up, locally attach or lease-line connect and emulate a 3270 terminal. Additionally, ASCII printers can emulate 1403, 3211 and 3286-type printers. All devices attached appear local to the host IBM and IBM plug-compatible mainframes.

DDR also provides RCOM communications software allowing upload/download of files for VM, DOS and MVS users.

The HyDra II requires no front-end controller or remote software, and attaches directly to a mainframe's byte multiplexor channel with a screwdriver. It's sold in 8-port and 16-port configurations.

New Security Feature Provides Automatic Default Logoff

WASHINGTON, D.C.—A new positive disconnect feature that automatically sends a logoff sequence to the host if a dial-up line drops, has been added to the HyDra II, according to Dave Gortner, DDR product manager.

Gortner today told leaders of the Micro-to-Mainframe Security Council that users can also customize their own logoff routine for added security.

INSIDE:

Security Access System provides Dial-Back Security for Modems

RCA ties IBM PC's through Local Area Network (LAN) to four HyDra IIs

Westinghouse links numerical control hardware to IBM host through HyDra II

ACOM software renamed RCOM—still 'bulletproof'

UPCOMING: New 2.5 release of HyDra II with password security

DDR announces RPFE remote printer management system for VM, VSE, CICS Users

Caledon in Erin, Ontario, named new Canadian distributor of HYDRA II.

'Features of HyDra II only Western Propaganda' —Khomeini

TEHRAN, Iran—In a public ceremony today, the Ayatollah Khomeini denounced the HyDra II and Diversified Data Resources, Inc. while demonstrators waved banners proclaiming "HyDra II: Direct Channel-Attach To Hell," and "Death to DDR Devils."

The Iranian newsagency, Yahada-Dn, said the outburst reinforces the Ayatollah's earlier condemnation of leading-edge DDR technology.

No larger than a breadbox and weighing under 30 lbs., the HyDra II is compared here with a telephone.

COUNTRY'S LARGEST RETAIL MERCHANDISER SERVICE USES HyDras FOR REMOTE INVENTORY CONTROL

RIVERSIDE, Calif.—By letting low cost ASCII printers replace a $350,000 laser printer, the HyDra II is helping the U.S.'s largest merchandising company here to implement a unique inventory control service.

RMSA, (Retail Merchandising Service Automation, Inc.), provides computerized merchandising for more than 4,500 apparel and sporting goods retailers, and needed to print bar-coded tickets for its new Micro Inventory Reporting And Control System. IBM's 3800 laser printer does the job, but it costs $350,000, company officials said.

With the HyDra letting ASCII dot matrix printers appear as local 1403s or 3211s to the IPL/4443 host, RMSA found an affordable way to print its bar-coded tickets.

Kelly McDonald, communications and data base coordinator at Brigham Young University explains the capabilities of two 16-port HyDra IIs to computer operator Daryl Mastin.

Follow the Leader, He's on a HYDRA

YOURTOWN, USA—Be at the head of the pack. Use the best micro-to-mainframe link in town. These companies do: General Motors, Chase Manhattan Bank, Westinghouse, Dow Chemical, Hughes Aircraft, Dysan Corp., and more.

DELTA ORDERS 12 HyDra IIs

ATLANTA, Ga.—Calling it a "harbinger of things to come" (see related story below), George Faucher, DDR national sales manager, today announced the sale of twelve HyDra IIs to Delta Airlines.

Delta has installed the HyDras in its computer center in Atlanta, where they will be direct channel-attached to six mainframe computers, running IBM's Airline Control Program (ACP) reservation system.

Faucher told Times reporter Ed Addeo that the sale acknowledges the HyDra II's dependability. "The reservation system must operate continuously, and can never be down, for obvious reasons," Faucher said.

"Delta needed something reliable to work with ACP, so they chose the HyDra," Faucher added.

'Entire Airline Industry will run on HyDras' —FAUCHER

SAN RAFAEL, Calif.—Delighted about new customers Delta and United Air Lines, who together have purchased 25 HyDras, the DDR national sales manager said "several" other airlines are about to take advantage of the substantial cost-savings and reliability of the HyDra II.

"It lets airlines use IBM PCs or ASCII terminals as a 3215 hardcopy operator console replacement instead of a 7412 controller," Faucher stated.

Fairbanks Morse Saves Time and $$ with Unique HyDra II

KANSAS CITY, Kan.—The Fairbanks Morse Pump Division of Colt Industries is saving thousands of dollars in retrofit hardware and support software with the HyDra II, it was reported today by the firm's EDP manager.

Martin Maney said he knew of no other device which allowed local attachment of ASCII terminals, printers, and PCs to IBM mainframes, while also permitting operators to dial in on the same network.

Thanks to the HyDra II's device support versatility, the pump manufacturer has not had to standardize its peripherals.

Brigham Young U. calls HyDra IIs 'Reliable' and 'Cost-Effective'

PROVO, Utah—At Brigham Young University here, the need for remote campus departments to access mainframe data led to purchase of 5 HyDra IIs.

Communications and Data Base Coordinator Kelly McDonald increased the school's dial-up capabilities, and reduced its hardware costs, since the HyDra doesn't need remote software and 370X or 327X controllers.

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EDITORIAL

Lessons learned in the desert

Now that the National Computer Conference has finally come and gone and summer can officially begin, it is appropriate to reflect on the industry's biggest event to see what gems we can mine from our collective experiences in Las Vegas.

Not all the lessons learned in the desert came easily, as the city's innkeepers found out. Consider, for example, that:

DPers don't gamble. Throughout NCC, the local papers in Las Vegas trumpeted the hotel owners' displeasure upon learning that computer types apparently avoid the gaming tables the way nice weather avoids the city in the summer. One hotel/casino owner, in fact, claimed that the DPers' aversion to gambling cost his establishment over $1 million during NCC week.

We're not terribly surprised at the owners' misfortune. After all, they were dealing with an element that cuts its baby teeth on statistical analysis, and it doesn't take a genius to compute the odds of leaving the tables a winner.

Besides, the casino owners should have known better. If there is one person in the world whose vocation teaches prudence and conservatism as opposed to chance, it is the DP manager. Ever known a DP shop boss who'd risk crashing his system to save a few bucks or a little time? We wouldn't bet on finding too many.

There were other lessons as well.

Las Vegas can be an inhospitable place in the summer, in more ways than one. The weather spoke for itself, with an incredibly hot, dry breath that most closely approximated the blast of a large air conditioner exhaust fan.

But how about the town itself? It seems that the memory of the tragic MGM Grand Hotel fire during Comdex nearly four years ago has done little to promote hotel safety in Las Vegas. Consider that, when a whirling sand storm knocked out the power for three hours at the Hacienda Hotel and Casino on the Las Vegas Strip, some three hundred would-be revelers sat in total darkness in one of the hotel theaters without so much as a lighted exit sign to show them the way out. The only emergency lighting was strategically placed around the bar and over the gaming tables, where the action continued.

Finally, there were some professional lessons, too.

The pace of change in the computer business is, if anything, accelerating. Micros continued their assault on a show that, for the first 10 years of its existence, was strictly a "big box" affair. The demonstration at NCC of a seven-company joint effort promoting a high-level communications protocol standard exemplified a radical change from recent years, change prompted in part by looser political and regulatory policies regarding cooperative efforts.

So we can be assured of one thing: NCC '85 in Chicago will be much different than this year's show. You can bet on that.

'Our forthcoming DBMS? We can assure you that within six months, we will reveal our preannouncement of the product announcement to be made not less than one year prior to preliminary product testing.'

LETTER

Right idea, wrong conclusion

The letter from Samuel Abraham, "Distinguishing 'computer language' from 'fourth-generation language' " [CW, May 7], has the right idea, but the wrong conclusion. It is right to reject ease of use as the criterion for defining a new type of language, but wrong to conclude that fourth-generation languages have no valid criteria to distinguish them from all others.

Abraham says that "third-generation" languages such as Cobol and PL/I are a different type of language from assembler languages because they provide a machine-independent form of programming. By a parallel argument, fourth-generation languages such as Sequel and Quel are a different type of language because they provide a data-structure-independent form of programming.

In neither case is the independence absolute or clear-cut. Most third-generation languages are based on the von Neumann model of computer architecture, so their machine-independence is only relative. Furthermore, machine independence is not uniform, even within a single language — consider the task of doing character-string manipulation in Fortran.

Similarly, most fourth-generation languages are based on a tabular or relational model of data, so their data independence is only relative. And it is sometimes necessary to drop down to a lower level to perform some tasks.

I first encountered a fourth-generation language in 1968 at the Institute for Social Research in Ann Arbor, Mich. Although the language we used was very primitive by today's standards, I immediately recognized that it was a superior approach to data base access. I still wonder why it has taken so long for this approach to achieve widespread use.

Carole D. Hafner
Warren, Mich.

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85 Computer Service Bureau/Software/Planning/ Consulting
90 Computer/Peripheral Dealer/Distributor/Retailer
95 Other Vendor _____

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12 VP/Assistant VP
13 Treasurer/Controller/Financial Officer
21 Director/Manager/Supervisor DP/MIS Services
22 Director/Manager of Operations/Planning/ Administrative Services
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CW-139

VIEWPOINT

Developing a sound DBMS support staff

THE DATA CENTER
John P. Murray

In a previous column in this series [CW, June 25], I stated that the information processing technology, that is, the hardware and the software associated with a successful data base management system (DBMS), is not a critical factor because it has advanced to the stage where, while sometimes difficult and frustrating, it is manageable.

That is correct, provided the installation has a strong, high-quality staff that understands and supports the DBMS and that is willing to carry on the work associated with the evolution of a data base management environment. The fact that high-quality technology is available does not mean that the task of the installation and development of a DBMS will be easy or quick. It is critical that both MIS staff and management understand, going in, that reaching the desired goal of a true DBMS environment will be time-consuming, expensive and often frustrating.

One way to build the required staff is to find someone with experience in the DBMS software package and select from and train the current MIS staff employees who have demonstrated their willingness to learn and grow and with an interest in the DBMS area.

Building the DBMS staff from existing MIS employees does take time. It will also require money for training. Such an approach will entail some additional risk, and it will require more time than would be the case if outsiders with considerable experience were brought in to do the work. Building with existing staff can provide improved morale within the MIS department. In addition, using people with experience in the organization provides knowledge not only of many of the business aspects, but also of the political aspects of the organization. Such knowledge can prove to be most valuable as the DBMS effort develops.

Identifying potential DBMS employees

How are these potential DBMS employees to be identified and selected? The most important attributes for people who want to become involved in the technical aspects of the DBMS, including areas like the data dictionary, documentation and standards, are maturity and flexibility. Because of the new and often different concepts associated with the DBMS, it is important that those who are in these positions be able to accept new ideas.

As the DBMS staff is assembled, it is most important to include someone with data center experience. The DBMS possesses significant operational changes, and a knowledge of its function (particularly the data control function) can be an important contribution. In addition, because most of the people in the DBMS group will have development experience, someone with an operations background will bring a different perspective and will add balance to the group.

Once the conditions of maturity and flexibility have been met, employees should be considered based upon their interest in the DBMS effort and upon their desire to learn and grow in that discipline.

The inherent responsibility associated with the DBMS is great from the start, and it grows rapidly as the function grows. Consider, as one example, the situation that arises when much of the organization's data is resident on the DBMS and the DBMS fails.

When such a situation arises, and it will in the best of installations, the effort to restore the DBMS and come back into service must begin at once and continue unabated until successful. People who do not appreciate such a condition, and who are not willing to do whatever is required to see the effort through, are of no value to the DBMS group. So, commitment must rank high on the DBMS personnel selection scale.

Given the pressure and the demands associated with assignment to the DBMS technical group, why should an assignment to the group be viewed as desirable? The question, "Why bother?" is certainly valid.

But so are the answers:

- Assignment to the DBMS group puts people right at the leading edge of the technology. This assumes the particular organization is committed to a successful DBMS venture and that progress is indeed being made toward that end. Assignment to a status quo DBMS effort is of course undesirable.
- Involvement with the DBMS, particularly in the areas of design, data dictionary and data administration, provides the opportunity to gain increased understanding of many aspects of the organization's business workings and to work to build an information rather than a data environment within the organization.
- The challenge and the opportunity to develop professional skills and knowledge within the DBMS environment can be significant. While the concept of the DBMS is well-defined, all data base environments, where the real benefits of the DBMS are pursued, tend to remain in a state of evolution. It certainly seems reasonable to speculate that whatever is being done under the DBMS today will seem (based upon the advances in the technology that will come along) rather limited five years from now. Boredom should not be a problem in the DBMS environment.
- There is one more practical aspect to DBMS involvement. The impact on the individual's resume should not be overlooked. Two issues will continue to enhance the value of data base experience: The number and importance of data base management systems will continue to see rapid growth, and the Cobol programmer as an important organizational entity will begin to decline.

I know, the Cobol bigots among you, the vast majority of my readers I suspect, will disagree about the future of Cobol. Let's see what the situation looks like three years from now. If my basic

See **STAFF** page 34

Murray is director of management information services for Rayovac Corp., Madison, Wis., and author of Management Information Systems as a Corporate Resource, *published by Dow Jones-Irwin.*

Micro software: A user-friendly model for mainframes

HUMAN CONNECTION
Jack Stone

Given enough time to do the job right, there is no question that mainframe software designers are marvelously capable of turning out world-class levels of user-friendly terminal systems. However, as so many DPers bewail, the exigencies of the current project don't often allow this to happen — at least in a first-generation release — and the results in such situations only promulgate in user circles the notion that computer centers are irreconcilably user-hostile.

Even more serious is the underlying concern among users that programmer/analysts don't understand the fundamental precepts of effective terminal operations. No doubt, the DPers are as adept as anyone at tossing around confidently the buzzwords that permeate conversations on the subject, which as a consequence, serves to induce, rather than reduce, user skepticism of DP designers' knowledge.

Fortunately, with the continuing expansion of personal computers into the business offices and executive suites, there are numerous models for applications system designers to choose from, or even more appropriately stated, there are some outstanding demonstrations of how terminal operations should be conducted. The classic choices, of course, are the spreadsheet programs, like Lotus Development Corp.'s 1-2-3, for example, whose designers seemingly wrote the bible on the subject.

Necessary attention to detail

The Lotus folks obviously took the extra time — a lot of it — to pay necessary attention to detail and to eliminate every conceivable barrier to usability in each operational area, including, but not limited to: field, record and file manipulation; data and text entry; display and printer output; training; and documentation. And the payoff is all there!

Now, even though use of electronic spreadsheets has been around for awhile, I'll bet dollars to doughnuts that the vast majority of computer departments have not even seen a demo of any of the hundreds of these products that are available for micros. If you have not already done so, do yourself a favor and arrange for a showing of one of these packages to make certain that every staff member is thoroughly familiar with — or better still, enthusiastic about — its terminal operating techniques.

Here are some examples to whet your appetite, chosen from 1-2-3, but typical of what is found in the latest generation of spreadsheets:

- Retrieval of a previously stored work sheet (file) is nothing short of exquisite. A single keystroke brings up the file command menu, and a second invokes the retrieval function and displays a segment of the file name list. A cursor move, a quick execute and whammo! A new work sheet is on the tube. Typical of the care that went into the display design, command processing is accomplished entirely in a narrow area at the top of the screen, thus eliminating the distractions of control screens flipping on and off the tube.
- Help screens are most impressive. Touch one key, and the software produces just the one in the Help hierarchy which you need, depending on where you are in the process flow. Further, the facility provides alternate exits (through parameter selection, of course), thus offering the user random access to further detail.
- Copying or moving a block of rows or columns is sheer delight. The techniques employed for relative referencing of work sheet cells allow not only the replication of absolute values, but also of arithmetic expressions through the execution of a single command and a couple cursor moves. Even more impressive is the mass move of a cell/block (subject to some obvious restrictions) wherein the cell variables are automatically adjusted to ensure that the arithmetic statements are performed correctly.

Then there are the data processing command functions, the display generator facilities, on and on — each more intriguing than the next. True enough, alongside the mainframes, the personal computers are negligible when it comes to production, but with respect to software spit and polish for users, personal computers are giving the big boys an exciting run for their money. ‡

Stone is an independent management consultant, educator and writer, specializing in DP human communications and personnel development, based in Washington, D.C.

VIEWPOINT

The coexistence of glass boxes and ivied halls

READER'S PLATFORM
Timothy Crowe

Technical writing is still the stepchild of data processing. As a technical writer, I don't like being a stepchild, but I guess I will have to bear it until technical writing has proved itself to be the symbiotic and equal complement of data processing technical expertise.

There was a time when the four-year college degree was the way to a "good" job. If father was not rich, the alternative was taking a job right after finishing high school to keep the home fires burning.

Then data processing burst upon the scene with all its urgency. A new avenue to good jobs was opened up, and a new elite was spawned — the computer programmer. Part-time, full-time, anytime courses in computerese began to flourish, not in the ivied halls of academia, but in the glass box down the street. Poor kids had found a way to big bucks, and they jumped on the bandwagon. They worked the entry-level jobs as accountants, bookkeepers, typists and factotums by day and went to the glass box down the street at night to study such arcane things as keypunch, tabulating, data entry, Cobol and JCL.

Crowe is a technical writer with Blue Cross and Blue Shield of Greater New York.

We know that any elite group has to define itself as the possessor of unique attributes — the rich kids in the colleges and universities had done it for centuries. They knew a little about Shelley and Keats, they could plow through a few pages of Caesar's *De Bello Gallico*, they had fought to stay awake through Business 101. They became the possessors of a discrete body of knowledge which circumscribed them as an elite — a cut above the poor kids.

A new dimension

Then the leveler, data processing, gave things a new dimension. The poor kids emerged from the glass box down the street talking about bits and bytes, sequential files, Boolean logic; they even spoke in tongues called Argus, Cobol, Fortran. A modern-day Babel was created. The poor kids had found a solution to the wrongs of the centuries. They formed their own elite.

And the poor kids sat down with the rich kids in DP shops in Tokyo, New York and London, and an uneasy coexistence began. The poor kids were not quite secure in their newly acquired elite status, and the rich kids could not stomach the fact that the poor kids were making more money than them. The standoff was inevitable. Words like nouveau riche and parvenu, which the poor kids did not understand, were whispered. Acronyms like Dasd, Vsam, Vtoc, which the rich kids did not understand, were bandied round the office.

And the rich kids asked why the salary structure had changed and who had done it. They found out that it was Personnel Man. He was the one.

Personnel Man had sat down ponderously, as personnel types usually do, and studied his benchmarks. He knew every position, its relative importance, its money value; he had done it for years. One kilo of clerical ability equals 1.5 pounds of supervisory experience equals $$$$ per annum. One Harvard sheepskin equals one lifetime at Katharine Gibbs equals $$$$ per annum. He could spit these equations out with the greatest facility.

New category

But now he was chagrined; there was a new category to be reckoned with — the Glass Box Man, the computer programmer. Personnel Man knew that he had to defile his sacred benchmark graphs and charts by inserting a new category; this had not happened in all his years in personnel.

What was the value of the certificate from the glass box down the street? And he juxtaposed the shabby, glass box certificate and the ornate, four-year, ivied halls sheepskin and fought with equations. He went into seclusion for months — it may have been years. When he emerged, harried, hairy, harassed, he announced at a world press conference: One glass box certificate equals one ivied halls sheepskin equals $$$$.

The world was aghast; Armageddon must be near, it said.

But the world didn't end. It went on inexorably.

And Personnel Man went into seclusion again. When he came out this time, he announced in his usual quasi-profound way: One unit of glass box knowledge is greater than one unit of ivied halls esoterics by $$$$.

The victory of the poor kids was complete.

As a rich kid, I have a dream that Personnel Man will disappear again soon and that when he comes out, he will say, in the words of the old Latin chestnut, *fiat justitia, ruat caelum* — let justice be done though the heavens fall. ‡

STAFF from page 33

skill was Cobol, I would be doing something about that problem. DBMS and fourth-generation programming experience will make you more marketable in the future.

In any event, the benefits of the DBMS can only be achieved with the help of a strong, knowledgeable staff. It is in the interest of members of the staff to accept the opportunities offered by the DBMS, to forget their prejudices and to develop their skills to enhance their careers. Correctly handled, everyone wins.

Next: The need for communication within the DBMS staff.

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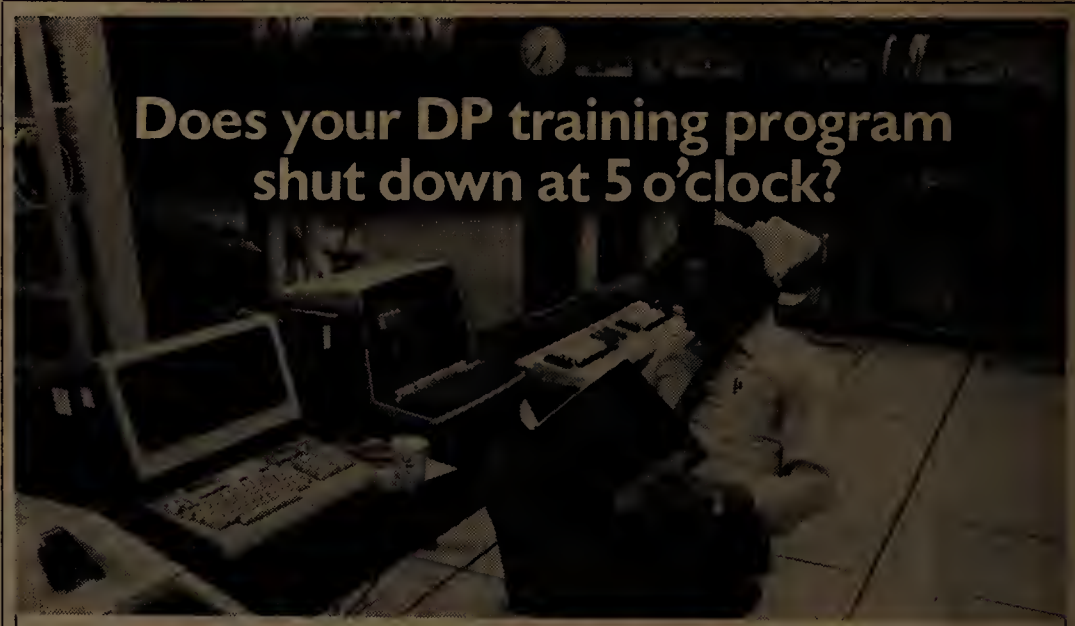

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SOFTWARE & SERVICES

SOFTLINE
Walter Nicholes

Basic: Alive, well but misunderstood

Enough already! I have reached my limit with those who demean the humble Basic language.

The offense is, surprisingly enough, most frequently committed by the guardians of information processing, the computer science purists. These are typically the scholars, and their understudies, who have advanced the technology to its present state. In universities across the land, the propaganda is taught that Basic is, by its very nature, an inferior language. Not so, I cry.

That marvelous combination of silicon and wizardry that we call the computer really has very few real talents. It can do assorted mathematical and logical operations on information in its registers; it can store the result in some numerically addressed memory location; it can access operands from some numerically addressed memory location; it can direct its flow of processing; and it can do all this at surrealistically high speeds. All other operations, which are features of the higher level languages, are merely combinations of these simple capabilities.

Now, let us examine the characteristics of a programming language. In most cases, the language does not exceed the natural capability of the machine. The simple I/O commands invoke a series of loads and stores to various externally symbolic, but nonetheless internally numeric, memory locations. The existence of a hardware device controller on that address does not alter this simple fact. The control structures that have undeni-

See **BASIC** page 36

Nicholes is the director of technical support for University Student Information Systems at Brigham Young University in Provo, Utah.

Issco Graphics tool targets IBM

SAN DIEGO — Issco Graphics, Inc. has introduced a graphics software product that is said to make data from IBM mainframes immediately available in chart format with a single keystroke.

Iviss Manager offers three new functions:

■ It lets the user maintain a library of charts that can be updated at any time. The charts may be kept in private libraries or shared with other users. Every chart is available at the touch of a button, a spokesman said.

■ It supports one-button production of paper charts, overhead transparencies and high-resolution 35mm slides on all IBM hard-copy devices and more than 60 non-IBM devices.

■ It provides full screen panels for chart access, modification and new chart creation using IBM's Interactive Systems Programming Facility dialogue manager.

Iviss Manager builds libraries of charts and provides a management system, including adding, deleting or modifying identification of charts, the spokesman said. Users may browse through libraries of charts or print them in bar, line, pie, text, table, map, Gantt or three-dimensional format or any combination.

Charts may be linked to other charts showing related data. Users have full screen menu control over the system and access to on-line Help functions. Charts in Iviss Manager may be produced by Issco's Tell-A-Graf or Dissplа software or by any other graphics software that works with IBM's Graphical Data Display Manager and Graphics Data File software.

Iviss Manager ranges in price from $18,600 for an IBM 4300 computer to $36,800 for an IBM 3084 mainframe. Until December, introductory prices are available of $12,600 to $24,800, respectively. Deliveries are slated for the fall, according to the vendor.

Issco is located at 10505 Sorrento Valley Road, San Diego, Calif. 92121.

NCC '84: Off-the-cuff observations

SOFTALK
Paul Gillin
and John Gallant
CW staff

Random thoughts on the 1984 National Computer Conference:

■ This year's NCC had a museum-like aura, with vendors using their exhibit space to display their existing wares. If visitors were hoping to capture breaking news and new insights, they were likely disappointed.

This is not intended to downgrade those exhibitors who chose NCC to announce new products or demonstrate current offerings. But NCC gave attendees who braved the scorching climate and the lure of the blackjack tables little information that was not already available.

The problem is not NCC's alone. Many recent shows have exhibited that nagging tendency of late. This may not bode well for next year's attendance as DP professionals re-examine their decisions to attend computer trade shows.

On the bright side, the show went remarkably smoothly. It was not marred by unforeseen events such as last year's grousing over the brick-oven tents or the intolerable weather at the 1982 show in Houston. The American Federation of Information Processing Societies, Inc. carried off the Herculean task of managing the conference with skill. Perhaps future shows will combine that organizational aplomb with some real meat.

■ Why was there such a deluge of data base management system (DBMS) announcements at NCC? New or enhanced products were announced by Cincom Systems, Inc.; Oracle Corp.; Relational Technology, Inc.; Battelle Memorial Institute; and United Software Systems and Services Corp. That is more large system DBMS activity than at any show — hardware or software — in

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INSIDE

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MVS/VS1 Users

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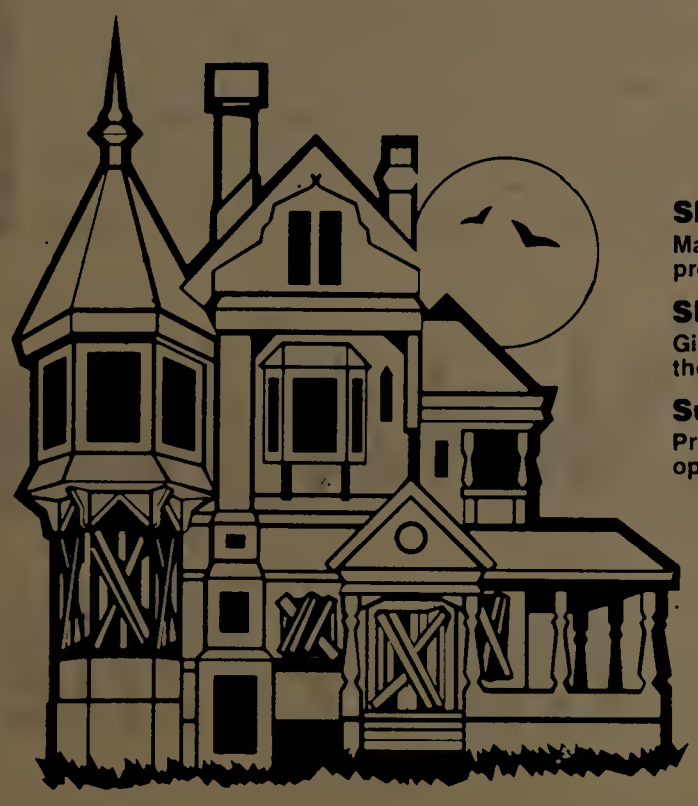

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SOFTWARE & SERVICES

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ably improved productivity and maintainability are also just a combination of extensions of the base machine's inherent operations.

Nearly all second-year computer science students have been trained to synthesize a WHILE or UNTIL control structure, not to mention the humble FOR-NEXT (loop type) mechanism. A similar point can be demonstrated for advanced mathematical and statistical operations, logical inferences, voice I/O technology or any other activity on any of the von Neumann machines. The whole idea of a higher level language was to invoke these primary operations without the necessity of redefining them each time. No matter how it is done, eventually it is all reduced to the same type of simple, elemental processing.

Linguistic chauvinism

The next typical manifestation of this linguistic chauvinism is the old compiler-interpreter debate. On this battleground, Basic always loses . . . or does it? My staff takes advantage of the interactive features of an intepreter to follow the execution of code until it has been debugged, then compiles the source into, guess what? A code so like assembly language that it can be modified in assembly (although I have never seen a really good reason to attempt it).

The real argument is not an argument at all to the truly knowledgeable. It is a discussion of the comparative values of speed and flexibility. All the debate about binding times and initialization and string limitations is subterfuge. Who really cares about when the memory bits actually toggle, so long as the desired result is achieved?

Now for the final point: During the last 12 months, I would guess that more people have learned Basic than all other languages combined. In schools across the country, people are learning to program in this simple language.

The snobbery that suggests that Basic cannot do much of what is currently being done or what needs to be done is ridiculous. I took a graduate class in artificial intelligence and completed my laboratory work in Basic. True, I wrote my own recursion mechanism, did bit masking mathematically and peppered my code with IF statements and GOTOs, but it did the job.

I propose that for the sake of intellectual discussion, or advancing the state of the art or even propagating information, the debate should rage on. But please, let us not belittle a language and its advocates in the manifest ignorance that has been prevalent to this point.

PRODUCTIVITY AIDS

NOI SYSTEMS, INC.
Showdiff

NOI Systems, Inc. has introduced Showdiff, an interactive file comparison utility for Hewlett-Packard Co.'s HP 3000 systems under HP's MPE-IV operating system.

Showdiff reportedly offers users accurate and reliable documentation of all changes made to source code or job control streams. It also reportedly allows line-by-line comparison of two Ascii files and displays the differences in a report.

Showdiff also reportedly facilitates testing by verifying whether a new version of a program will produce desired results.

Showdiff is priced at $975.

NOI Systems, Suite 405, 1877 Broadway, Boulder, Colo. 80302.

GATEWAY SYSTEMS CORP.
Synergist

Gateway Systems Corp. has introduced a fourth-generation application development program that reportedly integrates a shared-processing environment between an IBM Personal Computer XT or Hewlett-Packard Co. HP 150 and an HP 3000 superminicomputer.

Synergist offloads a range

Continued on page 37

CICS

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R&D had certain requirements that had to be met; manufacturing, accounting and marketing had others. Then microcomputers started showing up on desktops, with modems and printers here and there. Now you face the task of making it all work together. Sharing resources. Sharing information. And making more effective use of the information processing equipment you've already invested in.

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SOFTWARE & SERVICES

NCC from page 35

recent memory.

The probable reason, as put forth by Larry Ellison, president of Oracle, is that NCC tends to draw the technical crowds. Since DBMS is the largest identifiable type of software product for mainframes, it follows that there should be more activity there than in the applications area, which usually draws interest from an end-user audience. As usual, systems and utility vendors did not bother to introduce new products at NCC, probably expecting that they would be overshadowed by the DBMS activity.

■ One orbit around the NCC floor was enough to tell you why mainframe software vendors are not very high on the show these days. Of the few vendors that were there, most were nestled up against a wall somewhere or were ensconced in the Hilton Hotel conference area, well away from the hub of activity. Only Cullinet Software, Inc. seemed to have good placement at NCC. It was in the middle of the floor, not far from the IBM booth.

Waiting around the software vendors' booths looking for interview prospects was an exercise in futility. None of the exhibits seemed to be getting good traffic. Vendors generally said that they were satisfied with the turnout at their booths, but in contrast with the bustle in the hardware exhibits, the activity was negligible.

■ One local Las Vegas television station noted that the casinos were disappointed with NCC. Although attendance was expected to be among the largest in Las Vegas convention history, activity was poor at the gaming tables. Perhaps computer people are just not high rollers. Look at how many of them use IBM.

■ Sometimes the elements just conspire against you. Club Jansen Internationale, a fete sponsored by the public relations firm of Jansen Associates and 15 of its clients, suffered an unusual interruption to its planned evening of festivities on Wednesday, July 11. The entertainment, which was to include cocktails, dinner, a "fire-and-ice" show and massage, was sidetracked by a sudden windstorm that knocked out power in the Hacienda Resort Hotel and Casino for about four hours.

While hotel security guards came out of the woodwork to oversee the gambling tables in the casino, Club Jansen served over 200 guests by candlelight. The somewhat soggy ice show finally went on at 11 p.m., three hours late. Jansen people could be seen wearing holes in the carpet as repeated attempts to restore power failed.

Continued from page 36

of processing responsibilities to the microcomputer. It is said to enable the user to build and execute applications directly on the microcomputer while simultaneously maintaining on-demand access to any HP 3000 Image data base.

Prices start at $15,000.

Gateway Systems, 2277 Science Pkwy., Okemos, Mich. 48864.

ADVANCED SYSTEMS CONCEPTS, INC.

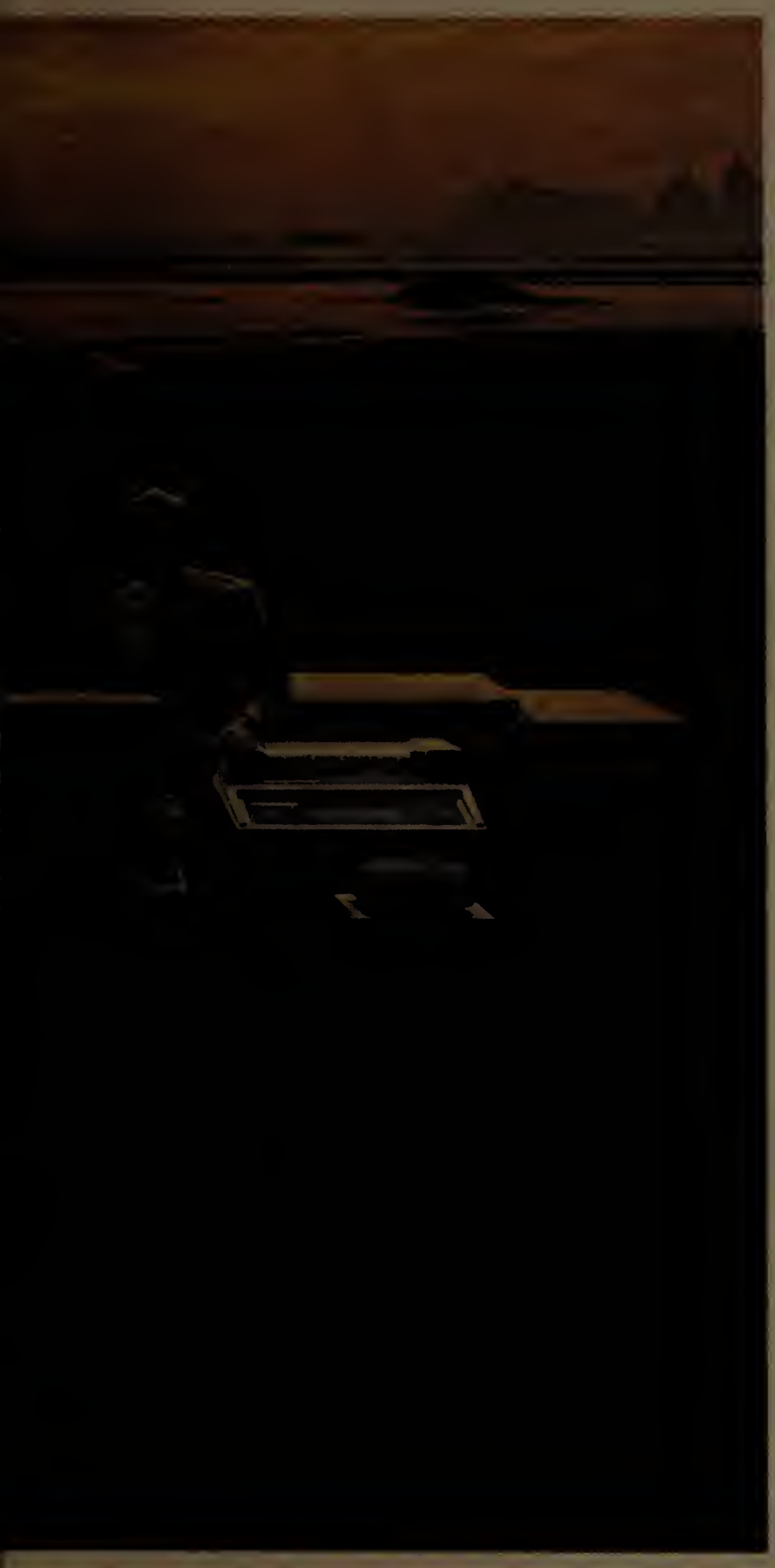
Abstract/38 enhancement

Advanced Systems Concepts, Inc. has announced an enhanced version of its Abstract/38 program for cross-referencing and documentation for users of IBM System/38 superminicomputers.

The vendor said it has added an exploded source listing that provides a condensation of the control language source code and the appropriate specifications from RPG and Cobol source for a job stream.

A further enhancement to Abstract, the vendor said, is multilevel reporting of interprogram relationships. Abstract also identifies pro-

Continued on page 38



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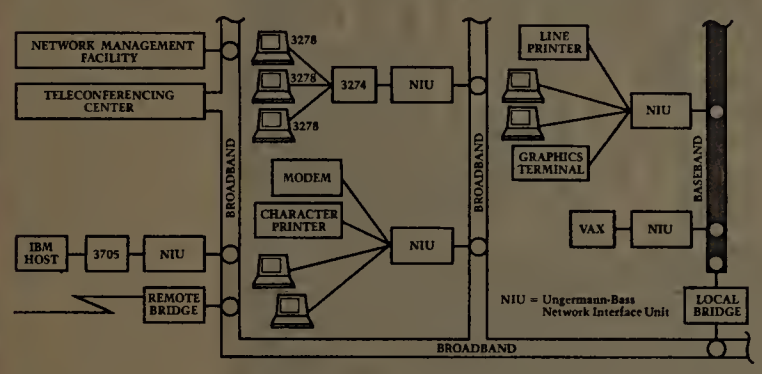

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"Creating the Future in Computer Communications"

Teledyne-Brown offers systems development tool

By Bryan Wilkins
CW Washington Bureau

HUNTSVILLE, Ala. — Teledyne-Brown Engineering has announced a systems development product that is said to automate the definition, design, testing and maintenance of complex software-driven systems, particularly in electrical engineering fields.

Called Technology for the Automated Generation of Systems (Tags), the package consists of the I/O Requirements Language (IORL) and a series of application packages. The software runs on Apollo Computer, Inc. supermicrocomputers.

The language is composed of mathematical expressions and graphical engineering symbols familiar to engineers, a spokesman said. The generator produces C code that can be ported to any computer with a C compiler.

There are four accompanying software applications packages with Tags that can be used with the IORL. Storage and Retrieval allows the system design engineer to create an automatic drafting system and data storage file for a project that is protected by password.

Configuration Management automates the tracking and assimilation process in which upgrades and changes are made to a design that has already been established.

Diagnostic Analysis automatically checks the design specifications for errors.

Simulation Compiler automatically generates computer simulation code from the IORL specifications to analyze in real time any part of the design, thereby avoiding the actual building of a system to test the design, the spokesman said.

Storage and Retrieval and Diagnostic Analyzer are immediately available. Storage and Retrieval is priced at $20,000, and Diagnostic Analyzer is priced at $25,000. Prices include installation, training credits and documentation.

The Configuration Management package will not be available until the fourth quarter, and the Simulation Compiler will not be available until the first quarter of 1985, the spokesman said.

Each package requires 1.5M bytes of main memory on the Apollo workstation; 5M bytes of disk storage are required for the two software packagages now available, and an additional 5M bytes will be required for the two yet to be released.

Teledyne-Brown is located at Cummings Research Park, Huntsville, Ala. 35807.

Continued from page 37

grams that are not called by other programs in the applications. Additional information available includes internal and external record layouts, file-to-file relationships, printer spacing charts, program usage of field reporting and reference field analysis, the vendor said.

A license for Abstract costs $1,000.

Advanced Systems Concepts, 1084 Cornell, Wheeling, Ill. 60090.

APPLICATION PACKAGES

UCCEL CORP.
Installment Loan Release 2.3

Uccel Corp. has announced an enhanced version of its consumer loan portfolio management program.

Installment Loan Release 2.3 reportedly provides accounting, reporting and control functions for portfolio management. The program has the capability to process in multi-institution environments, with each institution being processed according to its own requirements, the vendor said.

One enhancement of Release 2.3 is a multidisbursement processing function. This feature is said to allow a financial institution to tie individual advances on a revolving line of credit to an index rate. This is an additional option to a tiered-

Continued on page 40

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SOFTWARE & SERVICES

Continued from page 38
rate capability for revolving credit lines.

Release 2.3 also offers file expansions for variable rate processing. An expanded general ledger reporting option and other reporting changes have been included, the vendor said.

The program is designed to operate under IBM's OS and DOS operating systems on IBM 4300 series and larger processors.

Sold separately as part of the vendor's Infopoint package, Installment Loan sells for $72,000, according to the vendor.

Uccel, Exchange Park, Dallas, Texas 75235.

HEWLETT-PACKARD CO.
Maintenance Management

Hewlett-Packard Co. has announced an application software package for its HP 3000 minicomputer systems that is designed to help manage plant maintenance.

Maintenance Management reportedly can help maintenance departments increase machine utilization, improve preventive maintenance utilization and scheduling, reduce spare parts inventory costs, increase labor productivity and improve information collection.

The package is intended for use by capital-intensive industrial sites with at least 20 maintenance employees and spare parts and maintenance expenses totaling at least $1 million a year, the vendor said.

The program contains its key functions in five modules: work order control, equipment history, parts catalog, inventory control and purchase order tracking.

Maintenance Management is available in two versions. Model 30 includes all five modules and is priced at $60,000. Model 20, intended for customers who already have inventory control systems for spare parts, provides the parts catalog and work order control modules for $47,500.

Hewlett-Packard, 3000 Hanover St., Palo Alto, Calif. 94304.

CALMA CO.
Sticks 1.2

Calma Co. has enhanced Sticks, its symbolic-level integrated-circuit design software that runs on Data General Corp.'s Eclipse series of superminicomputers.

By attending to mask-level geometry, design rules and spacing, Sticks reportedly eliminates many elements associated with integrated-circuit design. New features reportedly include an enhanced user interface with hierarchical, dynamic menus. Pcell, written in GPL, is said to supply the user with a small, customized cell library, Calma said.

Another new feature automatically calculates space between circuit elements and produces closely packed circuits that conform to the user's design rules, according to the vendor.

Sticks 1.2 is priced at $67,000.

Calma, 2901 Tasman Drive, Santa Clara, Calif. 95050.

CALMA CO.
T-Boards

Calma Co. has introduced T-Boards for its Tegastation computer-aided engineering workstation for the design, analysis and simulation of digital electronic circuits and components.

T-Boards reportedly uses the same data base as the Tegastation and provides a consistent set of layout tools across engineering design and manufacturing functions, easing coordination between these departments. The common use of tools by all design participants reportedly allows engineers to "freeze" logic from designer changes while still permitting designers to change topological layouts.

The T-Boards module, which performs the actual printed-circuit boards layout, is interactive and offers pop-up menus and icons and a 32-bit, virtual memory programming environment. Included with T-Boards is Tegate software, reportedly an interactive graphics system for schematic capture.

T-Boards is priced at $100,000/workstation, the vendor said.

Calma, 2901 Tasman Drive, Santa Clara, Calif. 95050.

ASK COMPUTER SYSTEMS, INC.
Planman enhancements

Ask Computer Systems, Inc. has introduced an enhanced version of its Planman software. The enhancements to Planman reportedly include an expansion of the number of microcomputers on which it operates and its storage capacity for work sheet formats.

Planman is an on-line budgeting tool that reportedly allows general ledger account information to be transferred from a general ledger data base to a microcomputer. It is integrated with the firm's Manman manufacturing and financial information system and runs on the Hewlett-Packard Co. HP 3000.

Enhanced Planman is also said to offer greater downloading capability. Planman is available for $2,500.

Ask Computer Systems, 730 Distel Drive, Los Altos, Calif. 94022.

See **TOOLS** page 42

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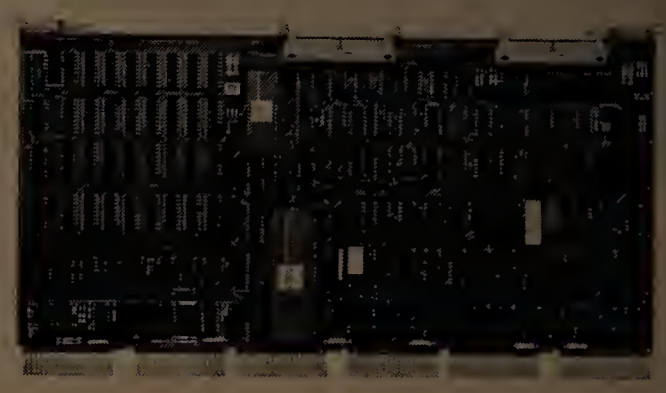

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SOFTWARE & SERVICES

TOOLS from page 40

LLOYD BUSH & ASSOCIATES
Model

Lloyd Bush & Associates has announced a new version of its decision support software for use with Hewlett-Packard Co.'s HP 3000 minicomputer.

Model can be used for various applications such as cash flow projections, budgeting, consolidations, sales analysis, cost estimation and bidding analysis, a vendor spokesman said. Additional modules include financial, forecasting and statistical libraries; goal seeking; consolidation; risk analysis; simultaneous equations; and multidimensional tables.

For external file interfacing, Model offers an interface to HP's Image data base management system.

The program costs $9,000.

Lloyd Bush & Associates, 156 William St., New York, N.Y. 10038.

INTERACTIVE DEVELOPMENT ENVIRONMENTS, INC.
Transition Diagram Editor

Interactive Development Environments, Inc. has announced the Transition Diagram Editor (TDE), described as a graphical software tool operating on the Sun Microsystems, Inc. Sun workstation.

According to a spokesman, TDE is the latest addition to the company's set of software tools supporting the User Software Engineering (USE) methodology. With USE, user interfaces and interactive systems are specified with an augmented-state transition diagram notation, which can then be executed by the company's Rapid/Use tool.

The spokesman said the dialogue description file used by Rapid/Use can be linked to operations written in C, Fortran 77 and Pascal as well as to the company's Troll/Use relational data base management system (DBMS). TDE serves as a front end to Rapid/Use, allowing a designer to draw state-transition diagrams interactively and generate input to Rapid/Use.

The price of TDE for the Sun workstation is $6,000 for the first machine in a cluster and $1,500 for each additional machine. Rapid/Use and Troll/Use are $2,000 and $1,000, respectively, for the first machine in a cluster of Sun workstations and $500 and $250, respectively, for additional machines.

Interactive Development Environments, No. 32, 44 Monterey Blvd., San Francisco, Calif. 94131.

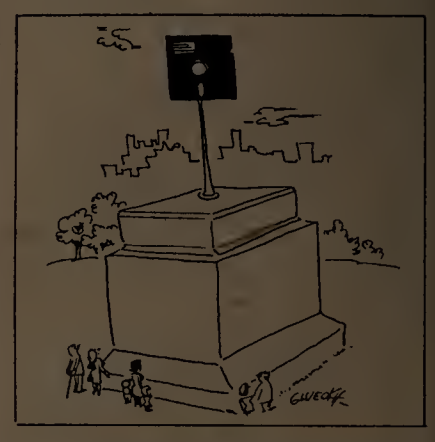
BRITZ PUBLISHIING, INC.
Days enhancement

Britz Publishing, Inc. has enhanced its Days calendar management system to run on the IBM System/38. Prior to the enhancement, Release 2, Days had only been available for the IBM System/34 and 36. The Days system reportedly provides a daily printed schedule of each day's items and events. Schedules may be printed for a week, a month or a range of dates.

The Days system also is said to allow items and events to be assigned to individual employees and/or departments and to permit multicompany processing as well.

The Days system carries a one-time charge of $99.

Britz Publishing, 1814 Capital Towers, Jackson, Miss. 39201.



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SOFTWARE & SERVICES

DATA BASE MANAGEMENT SYSTEMS

BRADMARK COMPUTER SYSTEMS, INC.
Dynamic Chain Restoration

Bradmark Computer Systems, Inc. has announced the Dynamic Chain Restoration utility software for users of Hewlett-Packard Co.'s HP 3000 superminicomputer with HP's Image data base management system. The software is intended to examine and correct any abnormalities appearing in a detailed set of data.

The utility software is said to conduct an examination without requiring the user to sign off. Corrective actions include restoration of broken chains, replacement of corrupted keys and resetting of erroneous bit maps. The program is also said to remove useless data.

During the summer only, Bradmark is offering the utility as a no-charge option with its Dbcopy II. As of Sept. 1, the product will be priced at $2,500, the vendor said.

Bradmark, 4446 Main St., Buffalo, N.Y. 14226.

LANGUAGES

LOGITECH, INC.
Modula-2/VX86

Logitech, Inc. has announced a programming tool that enables software developers to produce software for Intel Corp. 8086 microprocessor-based microcomputers using Digital Equipment Corp.'s VAX-11 systems.

Modula-2/VX86 is a cross-development system that can be used to develop software for 8086-based microcomputers running Microsoft Corp.'s MS-DOS or Digital Research, Inc.'s CP/M 86 operating systems.

The software comes with a standard library of modules and generates high-speed native code. Other features reportedly include support of Intel's 8087 numeric coprocessor, large-model and multilevel overlays for large programs, low-level software and hardware access, a set of development tools (including data communications and conversion utilities for uploading and downloading programs) and symbolic debugging.

The Modula-2/VX86 is said to be compatible with the vendor's Modula-2/86 base language system, allowing programmers to write part of a program on a VAX-11 and part on a microcomputer.

The program is priced at $4,500.

Logitech, 805 Veterans Blvd., Redwood City, Calif. 94063.

LANGUAGE PROCESSORS, INC.
LPI-Cobol support for RM/Cobol

Language Processors, Inc. (LPI) has announced support for Ryan-McFarland Corp.'s RM/Cobol on its LPI-Cobol compiler. The compiler runs on Motorola, Inc. 68000 processors under the Unix operating system.

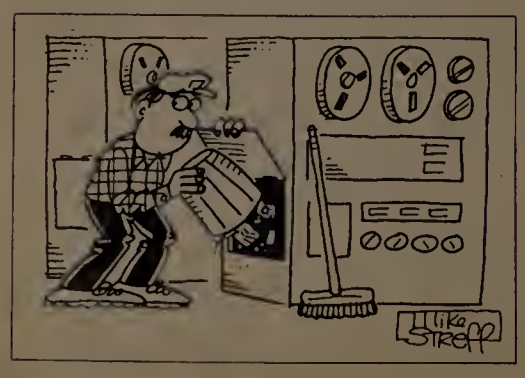
RM/Cobol software can be migrated to LPI-Cobol by a single recompilation, a spokesman said. LPI claims that its compiler provides a 15-fold increase in speed over interpretive compilers.

LPI-Cobol uses the company's Component Architecture, a modular software structure that includes a variable front end, global optimizer, common code generator, debugger and runtime library. Code is optimized and stored in machine code, eliminating the need to retranslate the program every time it is run.

In addition, users of LPI compilers can mix portions of programs written in other languages into a single program. LPI also sells compilers for RPG-II, C, PL/I, Pascal and Basic.

Single-copy prices of LPI-Cobol start at $1,000. Runtime library distribution agreements are available to OEMs, with license prices starting at $50,000.

LPI, 400-1 Totten Pond Road, Waltham, Mass. 02154.



ON-LINE DATA BASES

DIALOG INFORMATION SERVICES, INC.
Cendata

Dialog Information Services, Inc. has announced that it will offer access to U.S. Census Bureau press releases, product announcements and survey data via its on-line information retrieval service.

According to the vendor, the Cendata service will be available in late summer. It will provide current data on population statistics, agriculture, business, construction and housing, foreign trade, manufacturing and other information from the Census Bureau.

Users will have same-day, on-line access to such economic indicators as monthly durable goods manufacturing data, monthly data on housing starts and building permits, monthly advance retail sales statistics and balance-of-trade data, the vendor said.

The Dialog dial-up service requires a microcomputer and modem.

The price is $35/connect hour, according to the vendor.

Dialog Information Services, 3460 Hillview Ave., Palo Alto, Calif. 94304.

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Software-limiting routines: Some hazards to avoid

By Mark L. Gordon
and Steven B. Starr
Special to CW‡

Users beware. Preprogrammed "bugs" — limiting routines in software — have become commonplace.

As recently as three years ago, we would run across preprogrammed limiting routines in about one in 10 software acquisition negotiations for users. Now, it is more like nine in 10. And we find these bugs across the board, in everything from off-the-shelf microcomputer software to very expensive custom programs for mainframes.

Software protection routines, built in by vendors to protect confidentiality, proprietary and financial interests, can do serious harm to the unwary acquirer who does not have protection in licensing agreements from bug-related interference and damage.

The impact of unexpected limiting routines on users can range from inability to transfer software to a back-up computer to total system shutdown.

For example, one such limiting routine spelled disaster to a client — and to the software vendor.

Our client had signed an interim agreement for the use of a software product. He retained our law firm for the final negotiations, which included one of our normal functions — to limit or eliminate any preprogrammed limiting routines. In the midst of negotiations, while the vendor was refusing to remove the protective limiting routine, saying it had never caused any snafus, the routine was activated and shut down the client's entire computer system.

For a while, things got sticky.

Here are some other types of limiting and measurement routines to watch for:

■ **Encryption** of the source code, which may prevent or increase the difficulty of reverse engineering.

■ **Data bugs** that cause the software to be inoperative or to malfunction after a particular date unless the vendor modifies the program.

■ **Data flow** through a program, which can be measured and can be the basis for charges to a user.

■ Similarly, **time-elapsed routines** included by vendors that measure elapsed processing time.

■ **Data storage amounts** — the amount of data stored in a system, where possible to measure — which may serve as the basis for charges.

■ **Processing unit serialization** — the serial number of a particular processing unit is hard-coded into the program, and the program will operate only on that unit.

Vendors can be devilishly clever. At least one we know of has embedded a routine in which, after the preprogrammed event occurs, the program seems to continue operating, but is in fact outputting false data.

Clearly, a program that ceases to function for one reason or another can seriously interrupt a business operation.

The good news is that there are measures some users can take that, while not guaranteeing that problems will not occur, can give users a great deal of comfort. These steps can help make disaster much less likely.

■ Raise the question of preprogrammed limiting routines with vendors before software is tested or acquired. Realize that there is a tremendous increase in the use of such routines throughout the software marketplace. Learn about what might be present so that you can negotiate intelligently.

■ Recognize that if there is such a routine, serious damages can occur, which, under standard agreements, may be inadequately protected against.

■ The optimum situation is one in which the vendor guarantees or gives a warranty in the licensing agreement that no limiting routines are contained in the software. In this case, the user can further assure the vendor's sincerity by eliminating limitations on liability in the contract in the event of a vendor breach of this warranty.

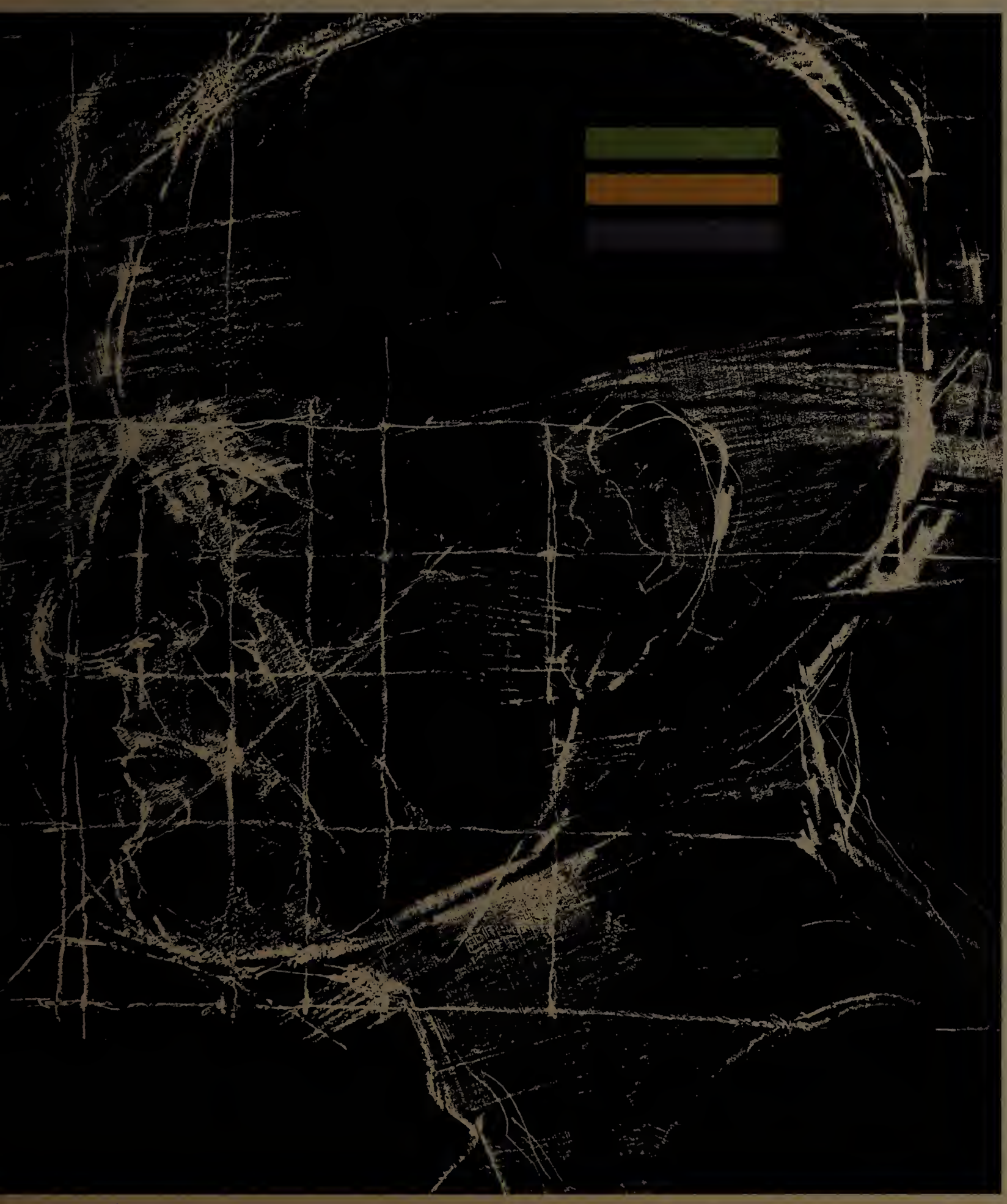
■ If the vendor will not agree to the warranty, and the user decides to acquire the software anyway, the user must demand that the vendor detail any triggering events that activate the limiting routine. He must also ensure that the user's staff has controls in place either to be prepared for such a triggering event or to avoid its occurrence.

■ In addition, the vendor should agree to unlimited liability in case the vendor does not reveal all the triggering events and an unforeseen event occurs, or in case the limiting event is activated through no fault of the user, and the user suffers damages.

The fine art of computer acquisition contracting continues to develop, along with the rapid technological advances in hardware and software. Users should be well informed about the latest limiting and measurement routines embedded in software design. The time to set up protective measures is in the acquisition negotiations stage.

Gordon is a partner in the Chicago-based law firm of Gordon & Glickson, P.C. Starr is an associate of the firm.

software that links



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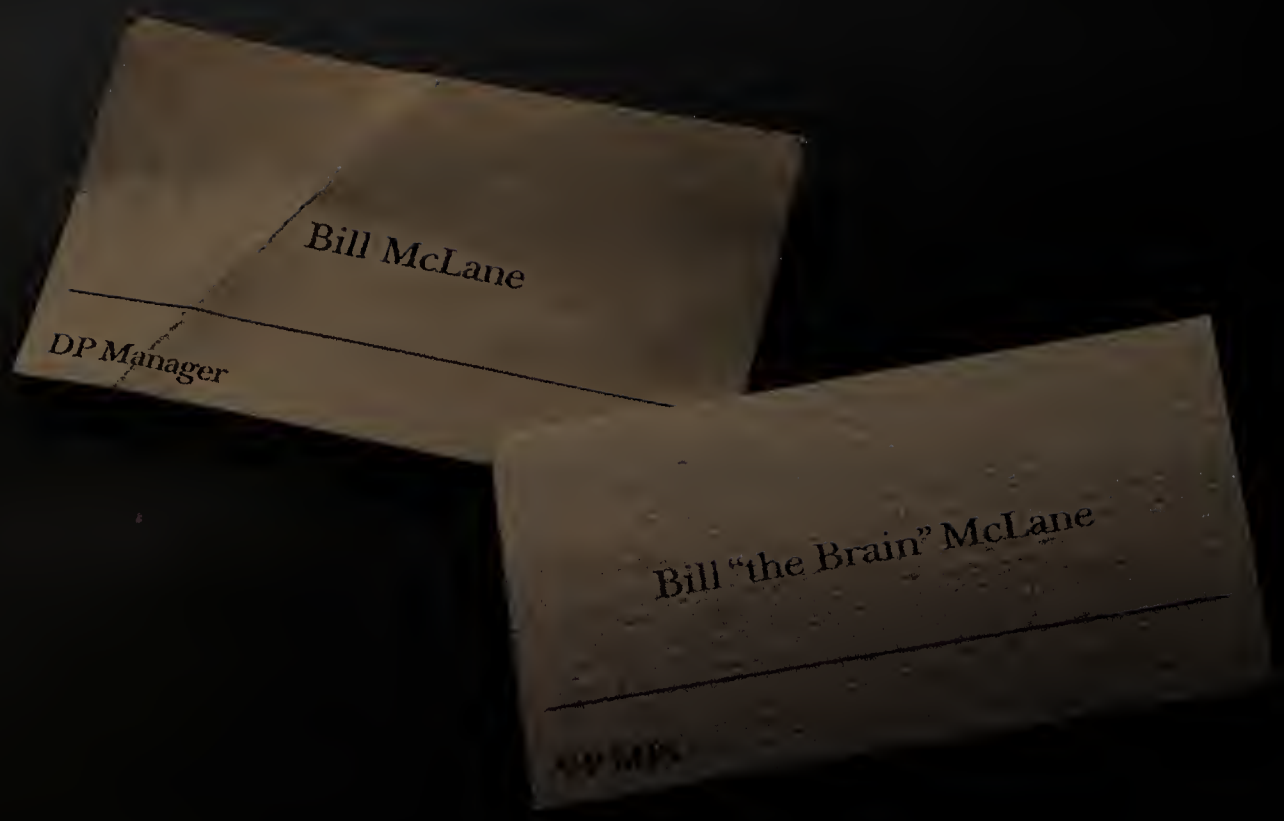

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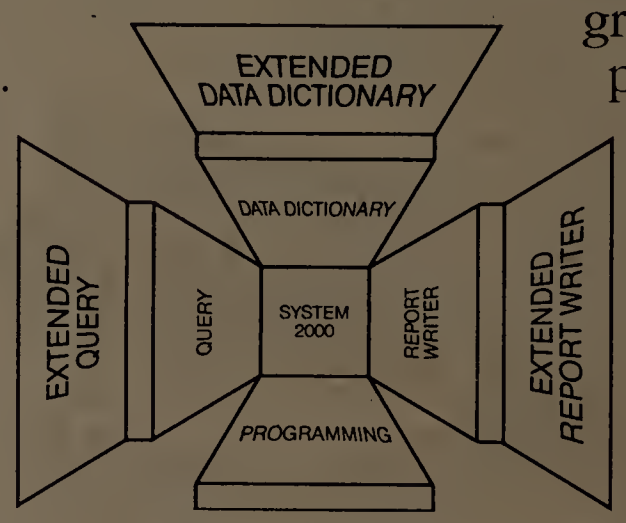

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COMMUNICATIONS

NCC sessions target multivendor net

By John Dix
CW Staff

"You can use the phone network to call France, but unless you speak French, or the party at the far end can speak English, you won't be able to communicate. You need to agree on a common language."

That is the goal of computer communications standards, according to Robert Blanc, director of the National Bureau of Standards' (NBS) Center for Computer Systems Engineering.

Blanc chaired the first of two sessions, called "Multivendor Networks," at the National Computer Conference here recently. These sessions were meant to supplement the ongoing demonstration of two multivendor networks at the entrance to the show floor.

Those demonstrations included the General Motors Corp.-sponsored token bus industrial network and an Ethernet-type business network sponsored by NBS and Boeing Computer Services Co. The International Standards Organization's transport protocol is implemented on both networks, which interconnect hardware from over 10 participating computer vendors.

The local networks in the demonstration are analogous to the phone network Blanc used as an example in his opening remarks; they enable computers on both nets to communicate, but do not guaran-

See NET page 52

GM a driving force behind network

General Motors Corp. was one of the driving forces behind the National Computer Conference network demonstration showing the interconnection of hardware from multiple vendors using standard high-level protocols.

GM has developed its own system specifications to contend with the proliferation of incompatible devices within its plants. These specifications, called the Manufacturing Automation Protocol (MAP), are modeled after the International Standards Organization's Open Systems Interconnection (OSI) network reference model.

Ronald Floyd of GM described recently the MAP project in the second half of the dual NCC session called "Multivendor Networks."

See GM page 52

Satellite links' operation delayed in N.Y. Teleport

WASHINGTON, D.C. — Staten Island's Teleport is likely to end up being mainly a regional bypass network rather than a place where terrestrial and satellite communications facilities interconnect.

That is the opinion of Dr. Jerome Lucas, president of Telestrategies, Inc., a consulting firm in McLean, Va., after hearing that Teleport officials have announced that initial operation of the facility's first three satellite dishes will be delayed until the end of this year. Originally, they were to go into service last month.

The Staten Island Teleport is being built by the City of New York, the New York-New Jersey Port Authority, Merrill Lynch Telecommunications, Inc. and Western Union Communications Systems, Inc.

Scheduled for completion in 1987, it will provide voice and data connections to domestic and international satellite services.

Some users will be located in an adjacent office park and others in surrounding areas of New York and New Jersey. The latter will be connected to the Teleport by a fiber-optic metropolitan communications network. According to Lucas, this network is likely to become increasingly popular even if the Teleport's original mission is losing some commercial appeal.

It is Lucas' belief that interest in local

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INSIDE

Local-Area Networks/**50**
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Network Services/**50**

Factory floor networking still in infancy, research report indicates

BOSTON — Networking on the factory floor is still in its infancy, according to a report from the Yankee Group, a market research organization based here.

The report, "Data Communications in the Factory," identifies three stages of development in factory networks, with the third level being the lowest. "The only thing that exists in factories today are Level III networks," reported Susan Lloyd McGarry, a senior market analyst for the Yankee Group's Factory Systems Planning Service.

Level III networks are usually proprietary, the report noted, typified by the use of an Allen-Bradley Co. Data Highway I to interconnect shop floor programmable controllers. According to the report, proprietary networks are typical at this level because they are economical, and "companies do not want to invest in an expensive network to tear it up in two years," McGarry said.

Bright spot on horizon

A bright spot on the horizon, McGarry noted, is the development by General Motors Corp. of the Manufacturing Automation Protocol (MAP) specifications, a standard for communication between incompatible computers and process controllers.

The MAP program was demonstrated recently at the National Computer Conference in Las Vegas. McGarry predicted that MAP will hasten the evolution of Level I factory networks, which, she said, could be realized within three years.

Level I networks would ideally integrate all major corporate computer functions, from computer-aided design and manufacturing to central data processing and shop floor process controls.

Before these networks can be developed, Level III networks will evolve into Level II networks. These nets will interconnect manufacturing cells and tie these pockets into each shop floor department.

To accomplish this, the industrial local-area networks used to interconnect the machines of a manufacturing cell would need to be interconnected themselves, the report said.

By itself, MAP does not provide for Level I-type capabilities, McGarry said; only Level II systems hold the potential for customization to Level I.

MAP is a step in the right direction, she added, because it is forcing vendors to realize the importance of internetworking. Those vendors, she said, have feared they would lose control over their customers through communications. "Industrial automation vendors are now beginning to understand that the lack of communications capability is slowing sales of their equipment."

An important consideration highlighted in the report is that, when implementing Level I networks, typical office local nets will need to meet higher standards for factory use. "An industrial local network, unlike an office network, must provide real-time, failure-proof performance," the report said. Because of this, local networks will develop along two lines — one for the factory and one for the office.

SST establishes international electronic mail service for micros

MARINA DEL REY, Calif. — Earlier this month, a new company implemented an international electronic mail service that it claims will enable users to send an "instant electronic letter from Los Angeles to Paris for less than a price of a hamburger."

Service Systems Technology, Inc. (SST), a company formed here in 1983 with financing provided by Olivetti Venture Capital, is providing the new service, called Tina International Message Service, to personal computer users here and abroad.

The central hub or post office of the electronic mail network is a Digital Equipment Corp. computer based in Milan, Italy. That computer is accessed using packet-switched, value-added networks, including Infonet and Tymnet in the U.S., Itapac (Italy), Transpac (France), Datex (West Germany), PSS (Great Britain), Datapac (Canada), Austpac (Australia), DDX P (Japan) and Telepac (Scandinavia).

Using his intelligent, asynchronous Ascii device, a user dials a local number and is given logon instructions in his own language. Once connected, the user can send and receive messages to and from subscribers in the U.S. and 50 foreign countries, the company reported.

The cost of the service, which includes network costs, runs between $50 and $60 per access hour, according to Richard L. Hecht, SST's vice-president. He estimates that the network's high-speed operation — 1,200 bit/sec compared with the 50 bit/sec rate of telex — and the ability to prepare messages off-line, enables users to send messages for 3% to 7% of the cost of an overseas telex.

More information is available from SST through P.O. Box 10190, Marina del Rey, Calif. 90295.

COMMUNICATIONS

Firms to implement systems interface

NEW ORLEANS — Northern Telecom, Inc. and Johnson Controls, Inc. have announced an agreement to provide an interface that will enable Johnson Controls' computerized building automation systems to communicate with Northern Telecom's SL-1 digital business communications system.

The integrated system described in the agreement, announced at the recent Building Owners and Managers International Convention here, will reportedly permit signals from sensors and controllers used in building management to be transmitted through twisted-pair telephone wiring.

Johnson Controls, located in Milwaukee, Wis., develops systems for energy and maintenance management and fire safety and security functions for single or multiple building facilities.

Northern Telecom, located in Mountain View, Calif., is the world's largest manufacturer of digital telecommunications systems and a supplier of integrated office systems.

LOCAL-AREA NETWORKS

UNGERMANN-BASS, INC.
Net/One X.25 Gateway

Ungermann-Bass, Inc. has announced a network gateway designed to interface its Net/One local-area network to public X.25-based packet-switched networks.

The Net/One X.25 Gateway reportedly can be configured to interface either to a packet-node host on Net/One or to a public data network.

The product is said to support up to 32 virtual circuits with an X.25 line speed of up to 64K bit/sec. Physical interface is by RS-232C, V.35 or RS-449 connections. Its benefits include reduced costs by enabling up to 32 RS-232 asynchronous connections to host computers over a single synchronous link, according to the vendor.

The X.25 Gateway is scheduled to be available in August for $10,090, plus $2,500 per network for software.

Ungermann-Bass, 2560 Mission College Blvd., Santa Clara, Calif. 95050.

PROTOCOL CONVERTERS

AVATAR TECHNOLOGIES, INC.
PA100 Turbo

Avatar Technologies, Inc. has released a protocol converter for IBM Personal Computers and Personal Computer XTs that captures data from IBM mainframes and transforms the data for use in Personal Computer applications.

The PA100 Turbo allows the Personal Computer to emulate a variety of IBM 3278 and 3279 terminals by connecting with a coaxial cable to an IBM 3274 or 3276 cluster controller operating in an IBM Binary Synchronous Communications or Systems Network Architecture/Synchronous Data Link Control environment.

The PA100 Turbo provides three modes of access to the mainframe: data transfer, file transfer and terminal emulation.

The price of the PA100 Turbo is $1,195, and it will be available in September.

Avatar Technologies, 99 South St., Hopkinton, Mass. 01748.

NETWORK SERVICES

AMERICAN BUSINESS LISTS, INC.
Instant Yellow Page Service

American Business Lists, Inc. has announced its Instant Yellow Page Service, a data base of more than six million U.S. businesses.

The 24-hour service reportedly lets users retrieve such information as how many businesses of a particular type are in any yellow page directory in the U.S.

There is a $100 one-time setup charge, a $15/mo subscription fee and $1/min connect time charge.

American Business Lists, 5639 S. 86th Circle, Omaha, Neb. 68127.

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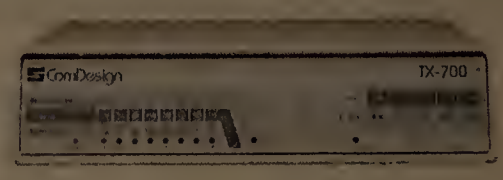

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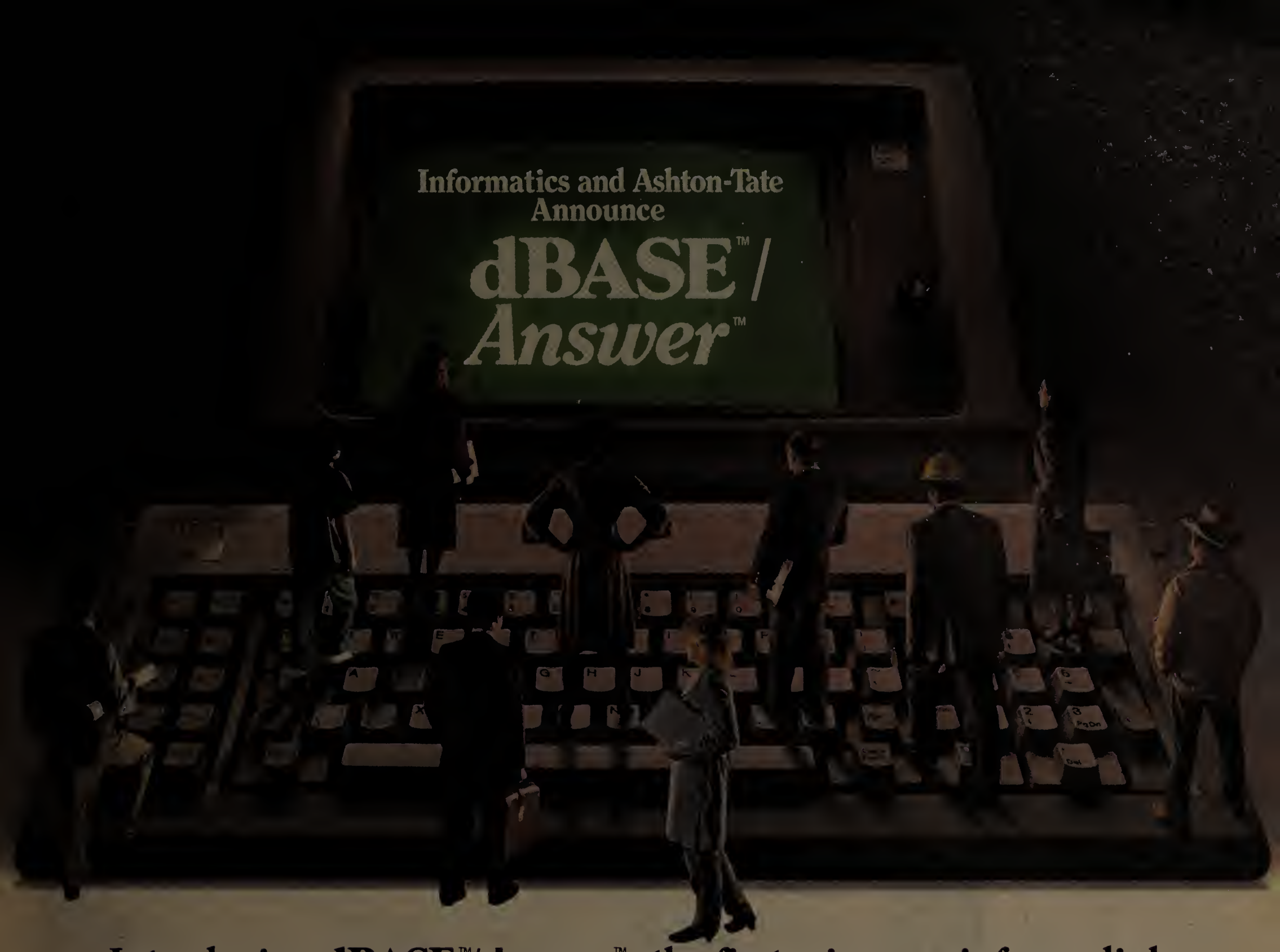

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NET from page 49

tee that the devices will be using the same language. That is the task of the higher level network standards that the vendors have implemented for this exhibit.

The session panelists discussed the networks and experiences gleaned from participation in the demonstration. Blanc cautioned the audience that most of the capabilities demonstrated were not possible to achieve with off-the-shelf products. "Standards aren't really useful until [they are commercially] implemented," he noted.

The most established standards are those that define local networks. These are spelled out at the lower levels of the International Standards Organization's Open Systems Interconnection (OSI) network reference model.

James J. Quigley, a senior programmer within IBM's industrial systems organization, said that because a common link-level interface is used in both network demonstrations (referring to the standard specified in the IEEE 802.2 used in both demonstrations), the actual type of local net used — Ethernet or token bus — is inconsequential.

The real task in standards development now, according to panelist Anthony G. Lauck, manager of networks and communications architectures at Digital Equipment Corp., is the definition of the higher layers of the network model.

In the demonstration, participating vendors implemented and tested the transport protocol specified at the fourth level of the OSI. Each vendor also implemented a file transfer protocol modeled after a subset of an OSI protocol that is not yet fully specified.

According to Lauck, other than the file transfer protocol, three other key high-level applications whose definition should be hastened are electronic mail, virtual terminal and remote job entry.

This is no small task. Allen B. Rochkind, a senior software engineer with Intel Corp., said the transport protocol his company developed for the exhibit took the equivalent of 50 man-months to develop.

For users, even this Herculean vendor development effort and commitment to standards will not remove all of the problems associated with creating open networks. Quigley and Rochkind concurred that OSI contributes only a small part in the development of multivendor networks.

Once OSI standard products are available, the real work for users will be in customizing the operating systems in their host computers to take advantage of truly open networks.

Session attendees, who filled the large meeting room, included a number of vendors that are concerned that OSI compatibility will soon be a common user requirement.

GM from page 49

Floyd said that MAP was developed to meet the onslaught of computer-controlled devices used in manufacturing. GM anticipates that by 1990, the number of intelligent devices used on the shop floor will increase by 500%.

The three primary objectives of MAP, according to Floyd, are to integrate these shop floor devices, define a migration path for network devices and eventually provide a utility-like network that can support equipment from multiple vendors.

This last objective, Floyd admitted, is ambitious. The idea is to be able to use off-the-shelf products that can be plugged into a network outlet. He anticipated that this capability will be possible by 1988, depending to some degree on the cooperation of system suppliers.

BYPASS from page 49

bypass facilities is growing among business users. He also pointed out that the Teleport has the political support its rivals lack, which should make it easier to get its communications services authorized in minimum time.

Regardless of the delay in cutting over the satellite connections, project officials said that it still intends to finish the Teleport in 1987, at which time a total of 17 satellite antennas are scheduled to be operational. The delay was attributed to difficulties in resolving contracts among the four partners.

Computer Interruptus

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SYSTEMS & PERIPHERALS

Trend to specialization found in superminis

By John Desmond
CW Staff

Perhaps a sign of a maturing industry, some makers of general-purpose 32-bit superminicomputers appear to have altered their marketing approaches to make their systems more appealing to specialized, or vertical, markets.

Unquestionably, the largest of these special markets is the engineering and computer-aided design and manufacturing (CAD/CAM) arena. But other markets, such as office automation and factory automation, also appear to be attracting vendors of specialized systems.

For example, since the beginning of the year, Data General Corp. has announced five specialized systems aimed principally at the graphics or engineering markets. Three of those products, the DS/4000 and the DS/4200 workstations and the MV/4000 small cluster (SC) configurations, use the firm's MV/4000 supermini as a base. The other two products, the GW/8000 and GW/10000, are specialized graphics workstations based on the MV/8000 and MV/10000 series superminis.

DG's move into the graphics marketplace was quite deliberate, noted Donald McDougall, vice-president and general manager of DG's technical products division. He added, however, that the company is also committed to serve the OA and industrial automation segments of the industry.

In McDougall's view, companies that survive the 1980s to be among "the few remaining big players in the 1990s will be the people who create the most successful partnerships" with third-party software firms, OEMs and even chip manufacturers, as IBM has done. "They're creating partnerships all over the place," he said of IBM.

Digital Equipment Corp. still markets its VAX 32-bit supermini to a general-purpose, or horizontal, market, according to a spokesman. But the spokesman added that many customers customize their systems for specialized applications by adding their own software or come to DEC for specialized work.

The market is so big that DEC has "no specific formula" for targeting vertical markets, the spokesman said. However, DEC does have products for specific markets, such as the Typeset 11 for publishing and typesetting applications. Some industry analysts believe DEC will soon unveil an engineering workstation based on its VAX series processors.

While Prime Computer, Inc.'s 50 series 32-bit supermini was designed for the general-purpose market, the company targeted three specific vertical markets: compu-

See **MARKET** page 56

■ A recent study of the market for graphics printers predicts strong growth, a new technological focus and more standardization by the end of the decade/**54**

INSIDE

Data Storage/**54**

NBI unveils workstation, micro

By John Desmond
CW Staff

LAS VEGAS — NBI, Inc. recently announced a 32-bit workstation for the scientific and technical markets, an office workstation with a 5¼-in. floppy disk drive and an IBM-compatible personal computer for the company's office automation line.

The U! Technical Workstation is based on a Motorola, Inc. 68010 virtual-memory microprocessor that runs at .5M to .75M million instructions per second, the company said. The product runs on the University of California at Berkeley's Unix Version 4.2 operating system and is said to support most applications designed for AT&T's System V version of Unix.

Local-area networking is supported using Ethernet and the U.S. Department of Defense's TCP/IP protocols. Glen Edens, vice-president and general manager of NBI's Technical Products Division, said at a press gathering at the 1984 National Computer Conference that the TCP/IP protocol was chosen to fit in with "standardization in the technical community."

U! Technical Workstation comes with 1M bytes of memory, a 640K-byte diskette and a 22M-byte hard disk, 1,024- by 768-pixel monochrome display of text and graphics and virtual memory providing each task with a 4M-byte address space, the vendor said. The product also features a mouse, a printer interface and two RS-232C interfaces.

The single-unit price for the workstation is $15,495, the vendor said.

NBI also introduced the Oasys 4000SC,

See **NBI** page 56

Study sees growth rate in graphics averaging 30% yearly through 1992

NEW YORK — Sales of computer graphics equipment and software will jump from $1.7 billion in 1982 to $6 billion in 1987 and to $23.3 billion by 1992 — an annual growth rate that averages 30% a year, according to a recent market study.

The study by Frost & Sullivan, Inc. here is called "Computer Graphics in the Manufacturing Industries." It stated that the market for computer-aided design (CAD) products is the largest single graphics market and will remain so through 1992. The study noted, however, that CAD's share of the total market will decline as other application areas grow more quickly. CAD composed 53% of the overall market in 1982 ($885 million). An average 28% annual growth will put it at almost $10 billion in 1992, or 43% of the market at that time. Computer-aided manufacturing (CAM) holds 9% of the market now and will be slightly less than that by 1992. Combined CAD/CAM sales total more than $1 billion currently.

Most of the remainder of the market is divided between business graphics and monitoring and control applications, according to Frost & Sullivan.

Business graphics — commonly used to clarify the meaning of large amounts of management data — will take on a larger role as uses become more varied. The study pegged this as the fastest growing segment, increasing by 40% a year as it rises from 17% of the total market in 1982 ($280 million) to 35% in 1992 ($8.1 billion).

Control and monitoring applications, most important in continuous-process industries such as petrochemicals and chemicals, is the third largest segment, with 17% of the 1982 market, or $245 million. By 1992, with a yearly growth of 25%, this area will account for $2.2 billion, or almost 10% of the total market.

Smaller applications analyzed in the 411-page report included research simulation, education, cartography, page layout and printed graphics.

In end-user industries, 83% of 1982 sales, or $1.4 billion, was accounted for by five industries: machinery, electrical and electronics, petroleum, transportation and aerospace and ordnance.

The machinery sector will log the best

See **STUDY** page 55

Minis seen coming back as controllers for local-area nets

By Mitch Betts
CW Washington Bureau

LAS VEGAS — Minicomputers, thought by some to be the dinosaurs of the industry, will make their comeback as controllers for departmental local-area networks, a market researcher said at a recent session on "Shared Network Resources," at the National Computer Conference here.

"The minicomputer is going to make a comeback in the automated office," predicted Dale Kutnick, executive director of the Yankee Group, a market research firm in Boston.

"It brings a lot of order to this desktop computer network," he explained.

Kutnick urged DP managers to create a homogenous local-area network in each department controlled by a minicomputer. But, he added, incompatible local-area networks can be connected using communications gateways.

"Departmental [local-area networks] solve isolated problems without committing the [whole] company to a single-vendor solution," he said.

Utility processor

Kutnick told session attendees that the minicomputer, which he also called a utility processor, "will have to evolve to better serve the requirements of desktop computer users; it must become more of a file/data base server. This represents a new product opportunity, and I wouldn't be surprised to see some of these products on the floor of the next NCC."

This new minicomputer product, however, may have a different architecture from current models. The utility processor, Kutnick said, may become two, three or even four processor boxes to control data base transfers, applications, peripherals and communications.

Kutnick said that today's networks merely provide for physical interconnection of dissimilar equipment, but products will be introduced in the next few years to manage and regulate the sharing of processed information among users. "The physical solution is less important than

See **COMEBACK** page 56

SYSTEMS & PERIPHERALS

Study reports impact of exploding graphics market

CUPERTINO, Calif. — The growth of the graphics printer market to 1.8 million units, worth $4.6 billion, in 1988 will be accompanied by dramatic shifts in the technologies used and in the user base, according to a recent study from Strategic, Inc. titled "Interactive Graphics Printers: Impact of Emerging Technology."

The combination of declining costs and larger and more sophisticated markets is leading to an explosion of new graphics hard-copy devices in a variety of technologies, threatening any companies that fail to keep up. The most important change is the shift to desktop business systems as the largest graphics market, both in units and in dollars, according to the study.

Another important factor influencing the graphics printer market is the interrelated development of technologies and products, such as graphics workstations and computer systems, graphics hard-copy peripherals and graphics software. The study projects the number and value of future graphics printers and the types that will be needed.

Given the variety of output technologies and variability in resolution, image quality and support of color; there is a strong tension between device independence and complete control of graphics output, which has prevented the development of portable graphics software.

Device independence would allow a variety of graphics displays and printers to be used with the same software without individual programming, but it would increase the complexity of operating systems and would fail to take maximum advantage of more capable devices, the study noted.

At the moment, there is little standardization, but the report pointed out that the development and marketing activities of key actors such as Digital Research, Inc., Microsoft Corp., IBM and AT&T will lead to market standards after several years of intense competition.

Looking further ahead, Strategic predicted the convergence of AT&T's Unix and Digital Research's CP/M operating systems, as well as the appearance of bit-map graphics hardware and software products, will be major factors in the development of key industry standards. These standards will be independent not only of applications and graphics printers, but also of operating systems and computers.

In the fracas between CP/M, Unix and Microsoft's MS-DOS, each will come to run all other software. The current competition among Apple Computer, Inc.'s Lisa and Macintosh, Visicorp's Visi On and the bit-map graphics to be supported by Microsoft and Digital Research will be equally confusing at first. Printer manufacturers will be equipped to support various incompatible hardware and software interfaces. Later, the problem will be resolved as each system is enhanced with emulations of the others and as each operating system allows all the others to run as tasks, in the manner of IBM's VM mainframe operating system, according to the report.

The leading graphics printers will be well-supported in each system, and new devices will either require special drivers for popular computers and operating systems or will emulate existing devices. This coming conflict will offer good opportunities for graphics printer manufacturers, and the standards that emerge will be even better for them.

The report is priced at $1,500. More information is available from Strategic through P.O. Box 2150, Cupertino, Calif. 95015.

DATA STORAGE

WINCHESTER SYSTEMS, INC.
Datasafe Dual 8/8R

Winchester Systems, Inc. has announced the Datasafe Dual 8/8R, an Intellec Isis-II operating system-compatible fixed/removable Winchester disk subsystem for Intel Corp. Intellec Series II, III and MDS-800 microprocessor development systems.

The Dual 8/8R offers a total of 32M bytes of disk storage. The vendor said 16M bytes of data can be stored on fixed media disk drives, while 16M bytes can be stored on removable media drives. The Dual 8/8R is said to be capable of using two 5¼-in. fixed media and two 5¼-in. removable media disk drives.

The subsystem is said to offer a data transfer rate of 625K byte/sec, with an average seek time of 40 msec. Other features include a power failsafe system, in which energy stored in the rotating spindle is used to generate power for the emergency head retract cycle, the vendor said.

The product includes an Intel Multibus host adapter card, which occupies one slot in the host chassis and conforms to IEEE 796 specifications.

The Datasafe Dual 8/8R is priced at $11,995, and a print spooling option that permits concurrent printing and development is priced at $1,250. A lower cost unit with half the storage and one removable cartridge drive is priced at $8,995.

Winchester Systems, 400 W. Cummings Park, Woburn, Mass. 01801.

See **STORAGE** page 55

STORAGE from page 54

INTERPHASE CORP.
Storager

Interphase Corp. has announced a multifunction caching disk/tape controller that supports the Seagate Technology, Inc. ST506 disk drive interface.

According to a spokesman, the Storager controller was designed to improve the performance of low-capacity, 5¼-in. Winchester drives like the ST506 and to support the high-capacity Winchester disk drives using the Enhanced Small Device Interface (ESDI) and the ST412 High Performance (HP) interfaces. The subsystem is also said to have a built-in QIC-02 tape interface and a floppy disk interface.

The spokesman said the controller's multitasking architecture allows simultaneous disk and backup streaming tape operations as well as concurrent disk and Intel Corp. Multibus operations.

Other features include two-state machines to handle Multibus-to-controller and controller-to-peripheral data transfer, concurrent file-oriented disk and tape transfers, support of two Winchester drives with either ESDI and ST506 or ESDI and ST412HP, control of four streaming tape drives with QIC-02 or Archive interfaces and cache memory to reduce the average rotational latency, according to the spokesman for the vendor.

The Storager disk/tape controller is priced at $1,695.

Interphase, 2925 Merrell Road, Dallas, Texas 75229.

CONVERGENT SOLUTIONS, INC.
Superdisk

Convergent Solutions, Inc. has released a Convergent Technologies, Inc.-compatible disk storage subsystem, with unit sizes ranging from 190M bytes through 760M bytes.

The Superdisk incorporates from one to four Maxtor Corp. 190M-byte 5¼-in. Winchester disk drives. The unit controller features 512K bytes of on-board, multiported cache memory, multiple look-ahead buffers and an architecture that results in an average access time of under 10 msec.

Prices vary according to configuration, with one 760M-byte unit priced at $23,990 and available in August 1984.

Convergent Solutions, 118-35 Queens Blvd., Forest Hills, N. Y. 11375.

STUDY from page 53

growth record in the years discussed, going from 17% of the market in 1982 to 27% by 1992, when it will have become the largest user industry. Dollar sales will increase 36% annually, from $290 million to $6.3 billion.

Electrical and electronic products manufacturing represented the largest manufacturing industry market for computer graphics in 1982, a $300 million segment, and will climb to $4.1 billion by 1992.

Petroleum and related industries will parallel transportation in performance: The two categories will each decline from 16% of the market to 11%, while growing from $270 million apiece to $2.5 billion, in absolute terms, between 1982 and 1992.

The aerospace and ordnance and the measuring analysis instruments industries will each increase computer graphics purchases by over 30% per year over the decade.

Turnkey systems will remain the largest selling product type in volume, but individual workstations will grow the fastest over the forecast period.

"It is apparent that the dominant form of workstation will be that which is complete in itself, rather than depending on shared or separate controller-generators and computers," the study added.

Turnkey systems constitute 30% of the market at present and will grow to 32% by 1992. Graphics monitors, the second-largest product category, will grow from 22% of the market to 26% during the decade examined, while workstations will increase from 7% of the total to almost 13%.

Over 40 suppliers are profiled in the study, which costs $1,300 and is available from Frost & Sullivan, 106 Fulton St., New York, N.Y. 10038.

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AMBI
Stamford, CT
Voice/data telephones
(Formerly Digital Transactions)

COGNOS
Ottawa, ONT
Business/financial software
(Formerly Quasar Systems)

COMPAQ
Houston, TX
Portable computers
(Formerly Gateway Technology)

DATAGO
New York, NY
Computer stores
(New venture of NYNEX)

DAYFLO
Costa Mesa, CA
Software for IBM PC
(Formerly Gilchrist Software)

ECZEL
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NBI from page 53

a word processing system for secretarial and clerical office workers. With the 5¼-in. floppy disk drive, the product extends the company's Oasys 4000, which shares hard-disk storage when attached to the Oasys 64 cluster controller, and the Oasys 4000S line, which uses 8-in. disk drives.

The 4000SC is based on the Motorola 68000 microprocessor and runs on the company's own Bosco operating system, the vendor said. The 4000SC also features single or dual double-density disk storage.

The 4000SC is priced in single-unit quantities at $4,995 with a single disk drive, and $5,795 with dual disk drives, the company said.

Finally, NBI announced the Oasys 4100S and Oasys 4100X personal computers for either stand-alone or network operation. Based on the Intel Corp. 8088 microprocessor, the products run on IBM's PC-DOS, the company said.

The 4100S is available with one or two 5¼-in. floppy disk drives, and the 4100X has one floppy disk drive and 10M bytes of hard disk storage, the company said. When attached to the Oasys 64 cluster controller, the 4100S and 4100X are capable of sharing information and peripherals with NBI's other workstations.

The 4100S with a single disk drive and 128K bytes of memory is priced at $2,725; the 4100S with dual disk drive and 320K bytes of random-access memory (RAM) is priced at $3,625. The 4100X with 320K bytes of RAM costs $5,475.

NBI can be reached through P.O. Box 9001, Boulder, Colo. 80301.

COMEBACK from page 53

the logical [information management] solution," he said.

The advantages of shared processing, he said, are the efficiency of load leveling between the micro and mini, management of data base sharing and monitoring of user applications.

Jerry McDowell, general manager of network technologies at Radionics, Inc., in Salinas, Calif., said that in the near future, DP managers also will have network management tools to monitor the productivity of the network, provide for network data security, generate reports and statistical analyses and manage the growth of the network.

But McDowell warned DP managers that they will have to push vendors to provide these network management features.

MARKET from page 53

tational time-sharing, interactive transaction processing and CAD/CAM, said Joseph Gavaghan, a communications specialist with Prime. The company has agreements with over 1,000 third-party software vendors for specific applications software, Gavaghan said.

"In terms of a trend, I've seen a lot that indicates marketing activities have become more vertical, but more on the software side," Gavaghan said.

Prime does not specifically target the OA market, but says its 32-bit systems can support OA functions within the major applications. "That's one place where having a 32-bit system works to your advantage; it supports both functions," Gavaghan said.

Two spokesmen for Hewlett-Packard Co. had slightly different views of the role of the 32-bit CPU.

"For most office applications, 32-bit [systems are] too much power for what needs to be done," said Michael Radisich of HP's Colorado office. "The [32-bit CPU] is for raw throughput power, for scientists and engineers who are computation-bound. They need throughput and accuracy in crunching those numbers. With dollars and cents, you just don't require a 32-bit machine."

Radisich does not see the 32-bit CPUs pushing the 16-bit machines out of the OA markets, unless the 32-bit price comes down further. DG's MV/4000 SC system for OA and graphics applications is priced from $35,000 to $59,500, similar to HP's range for its 32-bit CPUs for the technical office environment, Radisich said.

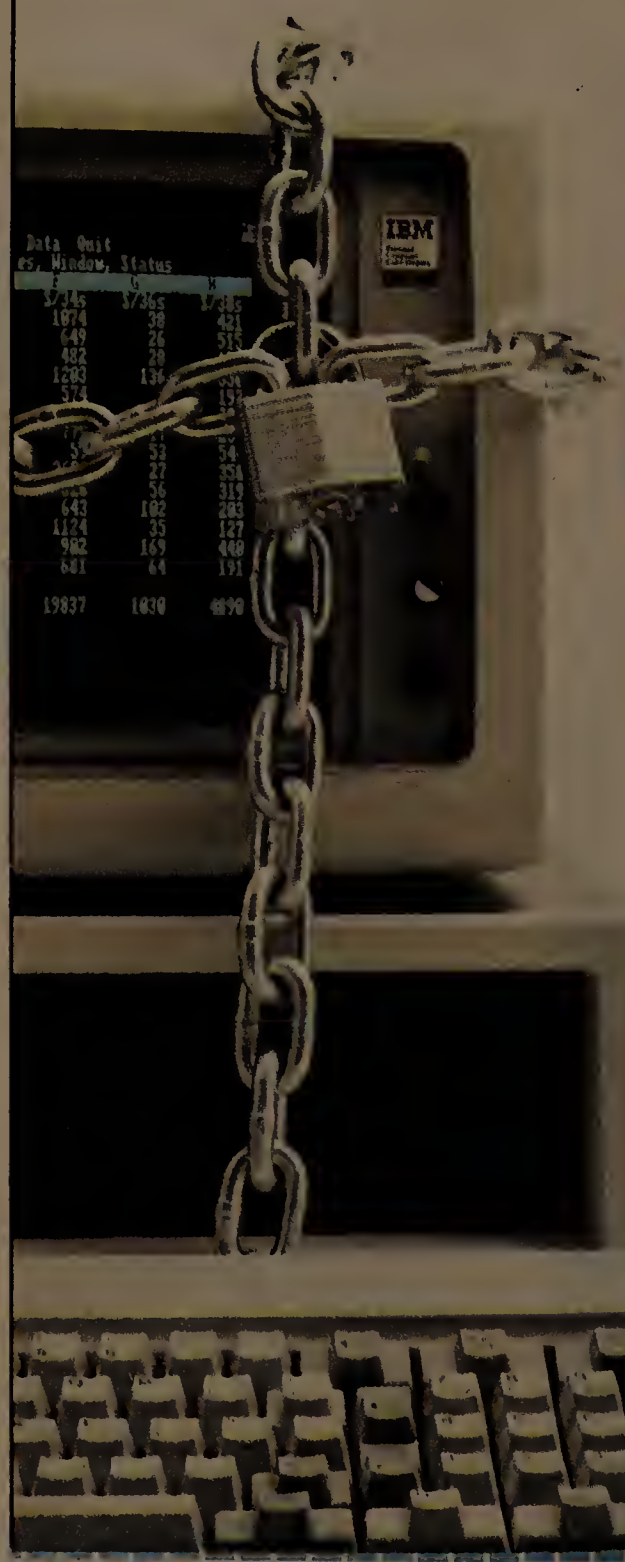
"Right now, the 32-bit machine is more expensive than that 16-bit machine," Radisich said. He expects that the 32-bit's advantages of increased speed and reliability will someday balance with its higher price to become more viable for the OA market.

But Jim Casey, manager of CAD/CAM strategic marketing for HP, said Radisich's point of view expresses where the company has been, not where it is going. With a series of product announcements upcoming within a year, HP will shift the focus of its traditional scientific and engineering target markets for 32-bit systems to include also the OA market, Casey said.

"The 32-bit processor does have a future, and our move will be to combine office along with scientific markets by having extremely powerful workstations," he said.

Casey sees the 32-bit CPUs as having a financial advantage for new users. "You can be in business for $50,000 with a workstation and have the power of a mainframe right on your desk," he said, while a mainframe system would cost several hundred thousand dollars. Does he think the 16-bit CPUs will be squeezed out? "There will be a market for the [16-bit machines], but the market will shrink and be supplanted by the 32-bit family," Casey said.

Some companies have tried attacking specific vertical markets with limited success. Dave Moschella, an analyst with International Data Corp. in Framingham, Mass., noted that Perkin-Elmer Corp. has not had a great deal of success in offering an office-oriented version of its 32-bit scientific-oriented superminis.



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IN DEPTH

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Standing up for the touch screen

While keyboards are necessary for data input, they are not the quickest way to select items from a menu or to manipulate data. The keyboard is a stumbling block for managers and executives who could benefit from a microcomputer.

By Jim Sutton

In the late 1950s, car dealers found it almost impossible to sell a car that didn't have fins. Today, the computer industry is questioning whether input devices, such as the touch screen and mouse, are truly useful or if — like fins — they are just gadgets added on to help sell computer systems. In fact, research into user interfaces indicates that these devices are useful tools.

In general, input devices were designed to make the operation of the computer and applications packages simpler and to lower the amount of expertise needed to become a proficient user. But some people view these devices as gimmicks. Research at MIT, Stanford University and a Fortune 1000 company, along with studies conducted by Hewlett-Packard Co., show that the touch screen is a genuine productivity tool.

HP studies on retail purchases of personal computers revealed that 80% of buyers are first-time users. For the novice, learning to use a personal computer is often the greatest barrier to getting started. Not only does he have to learn the particular applications he wants to use, but new users also must learn to operate the system — how to format disks, create files

and back up their work.

Traditionally, all these activities were performed with a keyboard. While keyboards are necessary for data input, they are not the quickest way to select items from a menu or to manipulate data. The keyboard is a stumbling block for many who could benefit from a personal computer, including managers, executives and other professionals. Knowing how to type should not be a prerequisite to using a computer.

HP is neither the first nor the only manufacturer to use touch in a computer system. Digital Equipment Corp. offers touch as an option for its Professional series. Gavilan Computer Corp. has incorporated touch in its portable computer, and independent vendors have made touch available for IBM and Apple Computer, Inc. computers.

While light pens are a fairly accurate pointing device, they pose several problems. One problem is simple usage: The user must keep the light pen in contact with the screen, which proves tiring and awkward.

The touch-screen concept emerged from research that had been done with soft keys and input devices such as light pens. In 1981, HP investigated the use of touch screen for industrial terminals. Various designs were tested for use in factory settings, where conditions are often wet, dusty or greasy. People who operate the terminals in factories often wear gloves. Touch seemed like a viable input method for someone wearing a glove. When it came to designing a personal computer for the mass market and determining which type of user interface to include, this initial research was already behind us.

HP was drawn to the touch screen for a number of reasons. We were impressed with the results of user interface studies performed by MIT. Its research showed that pointing and touching are the most immediate ways to make a selection.

HP then explored the use of touch by building several touch-screen terminals. Under its Partners Program, HP placed these terminals with one of its large customers for evaluation. The results were very positive. The middle-level managers overwhelmingly preferred touch to other input devices such as light pens.

Several problems

While light pens are a fairly accurate pointing device, they pose several problems. One problem is simple usage: The user must keep the light pen in contact with the screen, which proves tiring and awkward. Another problem is the seeming displacement of the cursor, or parallax, which occurs because there is glass between the pen and the plane along which the cursor moves. Like a mouse, the pen needs to be connected to the computer and must be picked up and put down each time it is used. Because of these impediments, the popularity of light pens has waned. They are now used mostly in computer-aided design.

The mouse is the primary alternative interface to touch. When the mouse and touch were evaluated by users in an HP study, there seemed to be a great "informal" acceptance of the touch screen. People got excited by it. Touch, unlike the mouse, is a direct input method. You touch the screen, and a command is executed. The operation of a mouse requires one level of abstraction more than the touch screen; users need a little time to become accustomed to the eye-hand coordination required to manipulate the mouse effectively. The touch screen is more intuitive. Users don't have to set aside a portion of their desks to use it.

These studies convinced us that touch was the most natural and easiest input device for the targeted user of the HP 150 — business professionals who may or may not have computer experience and many of whom are not adept with a keyboard.

For business professionals who use microcomputers primarily as a decision-making tool, the touch screen is an appropriate interface. Its full benefits are realized when it is integrated with the operating and applications software. The combination of soft keys and touch screen, for example, lets professionals select a function, choose an option and move the cursor without memorizing commands or using the keyboard.

Immediate interaction

Touch screens are gaining wider acceptance as they become more available. Some of the reasons for their popularity are their ability to reduce errors and make computers accessible to everyone, regardless of training, experience or typing skills. Most important of all, they redefine the interaction between the user and the computer. Touch screens allow the user to interact with data bases immediately, which eliminates the need for costly and time-consuming training. Complex processes can be presented step-by-step, with only valid options available for selection at any one time in the program. Therefore, the user is relieved of the burden of directing the interaction process.

While HP's research shows that the touch screen is an excellent interface for business professionals, the

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HP 150 was designed to allow a user to perform any operation either through touch or the keyboard. The key to a good user interface is to provide the user with options that match his expertise and personal style. People who already know how to use computers and are adept with a keyboard are not penalized for their existing skills.

Before HP actually went to market with the HP 150, additional research was done to see if people would use the touch screen and how they liked it. Six focus groups — composed of current and potential users of personal computers — evaluated the machine. The key benefit of the touch screen they identified was the saving of time by eliminating steps in manipulating data.

The HP 150's on-screen soft keys were viewed as self-explanatory and easy to manipulate and redefine. Some respondents commented that the combination of touch screen and soft keys not only allowed them to become productive quickly, but also created a sense of having a dialogue with the computer.

The groups also reinforced the fact that touch screen is particularly helpful for people who are "keyboard-illiterate." Touch screen was seen as a feature particularly suited for professionals such as executives and office managers who need information to make business decisions, but don't want to become knowledgeable about operating a computer.

Experienced users queried by HP also appreciate the timesaving aspect of the touch screen. Instead of using keys to position the cursor in a particular cell in a spreadsheet or to block out text to be moved, the user can point directly to the data. Experienced users and those with a solid command of the keyboard generally mix touch and keyboard in a way that gives them maximum utility from both.

A group of Stanford students in a human factors design class evaluated the touch screen's performance against that of a mouse after the HP 150's introduction. They found that for coarse positioning (select an option) and medium positioning (calculator on screen) the touch screen was faster. For fine cursor positioning (one character) the mouse was faster. The students recommended the touch screen for business applications because it was faster for menus and required less training and desk space.

Other reviewers generally favor the touch screen. It takes care of much of the interaction during applications programs, making many system-level operations seem natural. Reviewers found it an easy input device to learn and one that is hard to give up.

Problems with touch screen

Some people have expressed dismay with the level of resolution that touch screen offers. When a user needs very fine resolution, as required by some graphics packages, a mouse or graphics tablet is more appropriate. However, for the class of applications that business professionals use, the character-level resolution — fingertip accuracy — provided by the touch screen is as fine a resolution as people generally need.

A number of graphics packages are available for the HP 150. For these applications users can place a plastic overlay on the machine's keypad and use it as a graphics pad. The keys from the keypad map to cursor-positioning keys that are capable of pointing to any pixel on the screen. The pad also has a cursor "fast" key which, when used in conjunction with a direction key, allows the user to move the cursor rapidly.

Experienced users also appreciate the timesaving aspect of the touch screen. Instead of using keys to position the cursor in a particular cell in a spreadsheet or to block out text to be moved, the user can point directly to the data.

Critics of touch screen have occasionally voiced concern over the need for a user to lift his arm from the keyboard to touch the screen. They find this interrupts keyboard activity and becomes tiresome. Touch is used mostly to make selections between options, while most data is input through the keyboard. Users generally spend the rest of the time reading the screen and thinking.

Actual use of the touch screen amounts to a small percentage of the total time a user spends at the terminal. A reviewer from *Interact*, a publication put out by the HP 3000 International Users Group, noted: "We found the convenience and simplicity of the touch screen offset the negative effects of reaching to touch it."

As far as the interruption of removing your hand from the keyboard, it is important to note that all non-keyboard interfaces require some shift off the keyboard. This is not a real problem for most users.

Initially some users felt that the natural motion of pointing would interrupt the very ingrained motion of working at a keyboard. It seemed that stopping the typing process to touch the screen would slow things considerably. After using touch-screen, one user noted that using a function key that is placed out of

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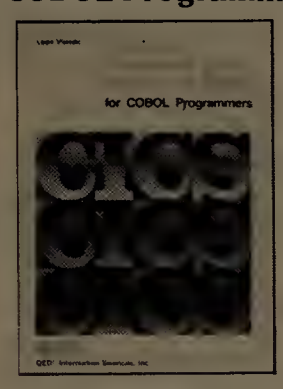

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touch-typing reach is just as much of an interruption. After starting with the function keys instead of the on-screen soft keys, the user preferred touch within a short time. It was at least as fast and psychologically more direct.

As far as the actual choice of touch-screen technology, HP wanted a technology that was reliable, would not affect the quality of the characters and was inexpensive to mass-produce. The technology HP chose — an array of LED around the screen that creates a grid pattern — is basically a solid-state device, with no moving parts or heat problems.

The technology can also be used by developers of applications programs to protect against activating a command accidentally with a misplaced touch. An application can be developed so that it either recognizes a selection when the screen is first touched or recognizes the selection only after the user has removed his finger from the screen. In the case of an accidental touch, the latter, two-step process allows the user to slide his finger to the correct field on the screen, activating a command only when the finger is removed from the screen. This two-step method also reduces the problems of parallax.

Since the user's finger only has to break the light beams, there is no need to actually touch the screen.

For some operations, such as choosing an application or deleting a file, the two-step process is elaborated so that it is really a two-selection process. For example, to start an application program, the user must first select the application and then touch a soft key that actually starts the application. This process saves time you might otherwise spend waiting for the wrong application to come up. It is also a safeguard against the accidental loss of data. The touch feature is incorporated in all of HP's proprietary software, and approximately 70% of third-party packages take advantage of touch.

Since the user's finger only has to break the light beams, there is no need to actually touch the screen. However, most users do touch the screen, so HP took a tip from consumer products such as refrigerators and ovens and used a special etched glass with a nonsmudge, matte finish. Not only is the screen resistant to fingerprints, the etched glass also cuts down on glare. Etched glass is durable, whereas coatings — the alternative — generally wear away.

To make operating the microcomputer even simpler, HP put a shell around the operating system. Known as the Personal Applications Manager, this program shields the user from having to learn Microsoft Corp.'s MS-DOS commands. Using the touch display to select and initiate functions, the user can choose applications programs, format diskettes, reconfigure devices and delete, copy, rename and back up files. These functions can also be performed with the keyboard.

There is no doubt that touch is a useful input device and that the use of touch varies by application and by the user's expertise with that application. HP is experimenting with refinements for touch — trying to develop a finer level of resolution and greater flexibility in moving the cursor around the screen — in order to make it even more useful.

No one interface can be all things to all people. HP is currently developing an architecture that will allow the user to hook up any or all input devices to a system in a device-independent way. In this way, each user can have the appropriate input device to suit any application or any personal style of interaction.

About the author

Jim Sutton is section manager for research and development in HP's Personal Software Division, Sunnyvale, Calif.

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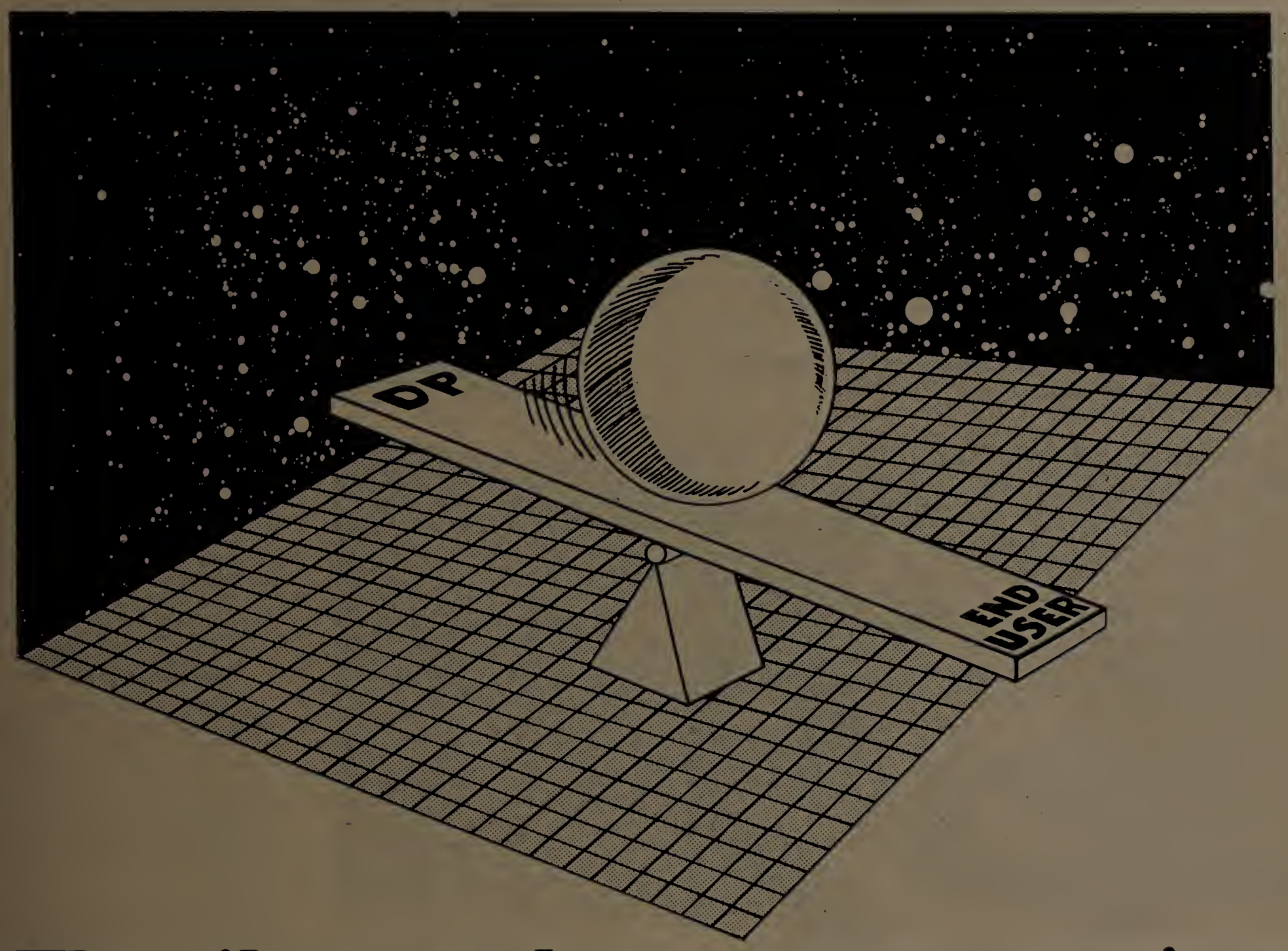

The tilt to end-user programming

End-user programmer hours, full and part time, soon may exceed those of the data processing department. End users also may take away from DP responsibility for planning and implementing much of the new information technology.

By Ronald A. Zink

End-user computing is changing the role of information services departments. How they identify and react to their new role will have major consequences for the success of their organizations.

As more programming moves out to end users, control declines. The systems being requested and developed are no longer transaction-oriented, automating clerical functions with well-structured procedures. They are higher level systems attacking unstructured problems in which the user is an integral and dynamic element.

What we are seeing is only the beginning of a trend. Many of the functions traditionally under the information services department will move to end-user departments. End-user departments are taking over the programming function at an ever-accelerating pace. Not only are end users using computers as part of their jobs, they are reassigning responsibilities to create full-time "distributed" programmers.

The new languages are easy enough to learn and use that a programmer's functional business knowledge gains preeminence over the technical. However, contrary to the sales pitch of many software salesmen, they are not so easy as to eliminate the need for a certain level of specialization when performing some of the more sophisticated tasks. Most data processing

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departments have not been able to increase staff enough to take full advantage of the new technologies.

End-user programmer hours, full and part time, may soon exceed those of the information services department. Using the more productive, albeit less machine-efficient, fourth-generation and modeling languages, these end-user programmers will perform the majority of programming and consume the majority of machine cycles.

As programming continues to move into the user departments, so will the actual responsibility of planning for and implementing much of the new information technology. Many hardware and software vendors are beginning to recognize this shift. A basic management tenet is that the person responsible for results should have control over the resources necessary to produce those results. The only legitimate reasons for violating this principle are for control purposes or to share an expensive and scarce resource.

All business benefits are derived through user departments. As programming ability and computer literacy increase in the user community, they gradually become less expensive and scarce. The user, therefore, will be required to assume more responsibility for applying systems development technology to enhance his contribution to the organization.

Is end-user computing really effective? Are the results attributed to it in reality the result of the effectiveness of fourth-generation languages coupled with the expansion of programming manpower? We must also ask what becomes of the role of the information services department in controlling the pace at which the new technology is implemented.

The approach that most information centers have taken is that of trainer, technical consultant and coordinator, ensuring hardware and software compatibility. This role, however successful to date, may very well prove inadequate as end-user programming becomes the norm as opposed to the exception.

Restrained usage phase

End-user computing in the typical organization begins as information retrieval on a limited but steady basis. At some point a "champion" emerges. A user who recognizes the potential of directly using computing resources takes hold of an end-user language and applies it to produce business results that attract upper management's attention. The champion wakes up his fellow users. Suddenly, all preconceived computing notions vaporize, and the user community realizes that the new tools are no longer optional; they are essential for success.

Thus commences the unbridled growth phase for the information center. Users demand training, access to information and new computing tools. Competition develops between user departments and, as each attempts to outdo the other, additional demands are placed on the information center. At this point, the information center, having been lulled into complacency during an initial period of slow growth, can do little more than react to the burgeoning demand; it rarely has solid policies, procedures and programs in place.

It is easy at this point for the information center to develop a false sense of security. Its employees may feel the information center has arrived — fulfilling its job as trainer, implementer of new tools and technical consultant.

Amid these early successes, however, small but prophetic pockets of confusion emerge. The same reports from different users begin to produce conflicting results: Models no longer work with the advent of a new fiscal year; a department finds out that the report it relies on has been wrong since the accounting department changed the product code numbers. As systems become interrelated, the complexity grows exponentially, as do the pockets of confusion.

At some point, the organizations begin to realize that there is a diverse group of users who report to

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no central authority. The group has different and often conflicting goals, different timing requirements and little information processing background. It reports to individuals who have no information processing background. Considering the difficulty that we information processing departments continue to experience in coordinating our own efforts when all programming projects report to one individual, can we expect a diverse group of end users with relatively little experience to avoid the problems of the past?

In short, as end users expand their efforts and begin developing more interrelated systems, we may be heading toward deep trouble if we continue with a laissez-faire attitude. But chaos will result if we continue to polarize users' efforts as something separate from the mainstream of data processing, something handled by an understaffed "fringe group" called the information center.

New role

End-user computing is becoming more than a mainstream activity; it is becoming *the* mainstream activity. Managing it is the new role of the information services department. The information center must expand end-user computing by creating the managed environment in which it will continue to be effective as it grows. The goal is to develop an environment that will allow end-user computing to blossom by removing the factors that potentially inhibit its effective implementation. The information services department must identify where end-user computing is effective, where it is not, where problems lie and what to do about them.

In order to respond to this new role we must first look at the conditions under which end-user computing is effective and why. There are three general areas of end-user computing: report writing, modeling and system development. Report writing has traditionally been the bulk work of end-user computing. Report writers are so simple that it is often easier to learn to use them than it is to tell a programmer what is needed. This simplicity, coupled with the improved turnaround so important to interactive analytical tasks, makes report writing an ideal candidate for the user.

The key is the simplicity of the language and its convenient accessibility to information. This is a function of two factors. The first is the elegance of the language itself, and the second is the structure of the data. Unfortunately, most systems were not designed with a report writer in mind; they were designed for transaction efficiency. The customer number is on the order file, but the customer name is on the customer file. This arrangement leads not only to complexity in programming effort but unacceptable machine usage and response time.

At some point, technical skills begin to overcome business knowledge when dealing with fragmented data structures, rendering end-user computing less effective. Additional problems exist even when a data base has been developed for the end user or the file structure is simple. End-user programmers, in order to make up for a lack of available data or to ease programming, will embed data into a program and often pass this program to other users.

As end users expand their efforts and begin developing more interrelated systems, we may be heading toward deep trouble if we continue with a laissez-faire attitude. But chaos will result if we polarize users' efforts as something handled by an understaffed "fringe group" called the information center.

The same program often lies on multiple user IDs and may be executed regularly by individuals who have little or no idea of the underlying data or process upon which the program's results are based. This situation can be likened to having multiple versions of the same production program, which causes a maintenance nightmare with every change. In the case of a distributed program, it may very well be that no one is responsible for this maintenance.

The second area of end-user computing is modeling. The typical modeling package is geared toward financial analysis and profit planning, but modeling also applies to all spreadsheet packages. The languages are either simple enough or tailored to a specific type of user that they can be learned easily and quickly. Modeling is usually a very effective tool, especially when viewed more as a "supercalculator" function than a computing function. Problems begin to emerge when users develop models that spreadsheets or modeling packages are not equipped to handle. The result is often not only an inefficient use of an individual's time, but a model so poorly structured and complex that it is virtually impossible for anyone but the author to understand.

A more serious problem with modeling occurs when significant information must be entered. It is perplexing to see the financial organization demand overly sophisticated and redundant batching and controls for transaction systems with relatively low exposure, yet enter sales

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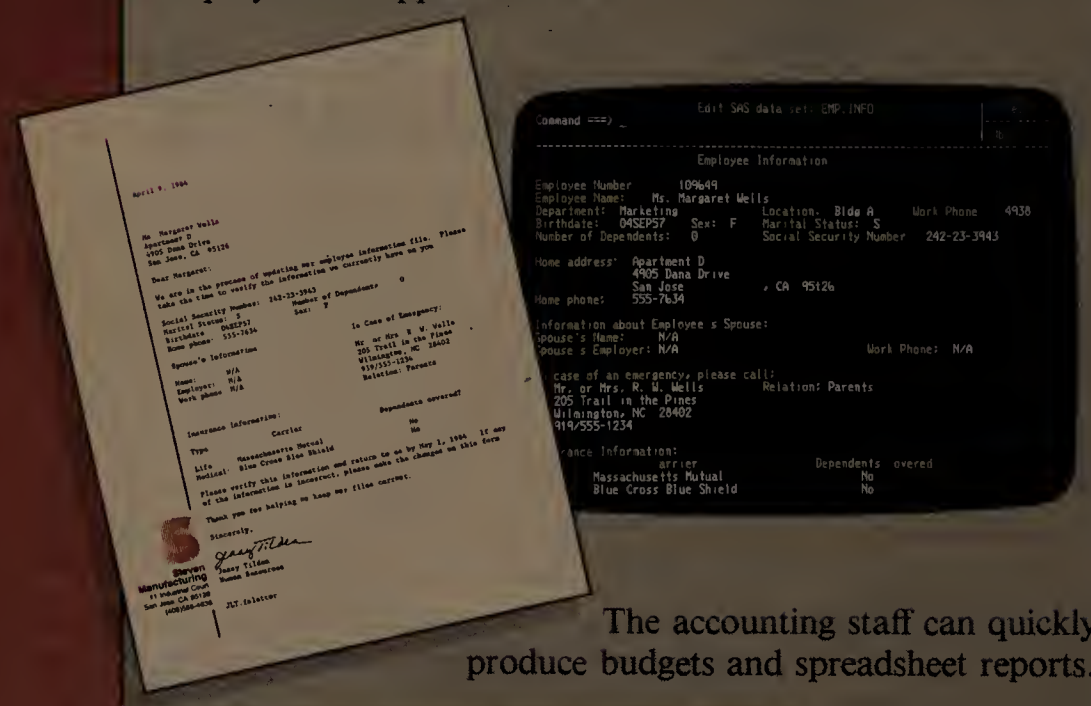

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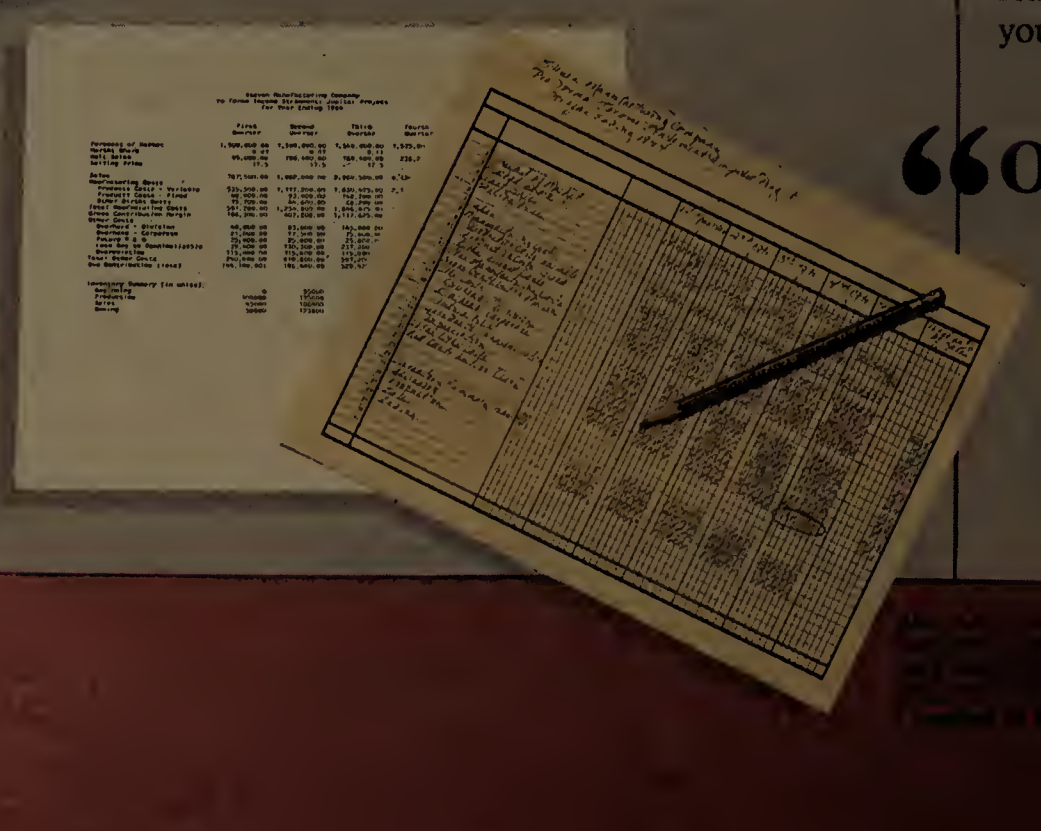

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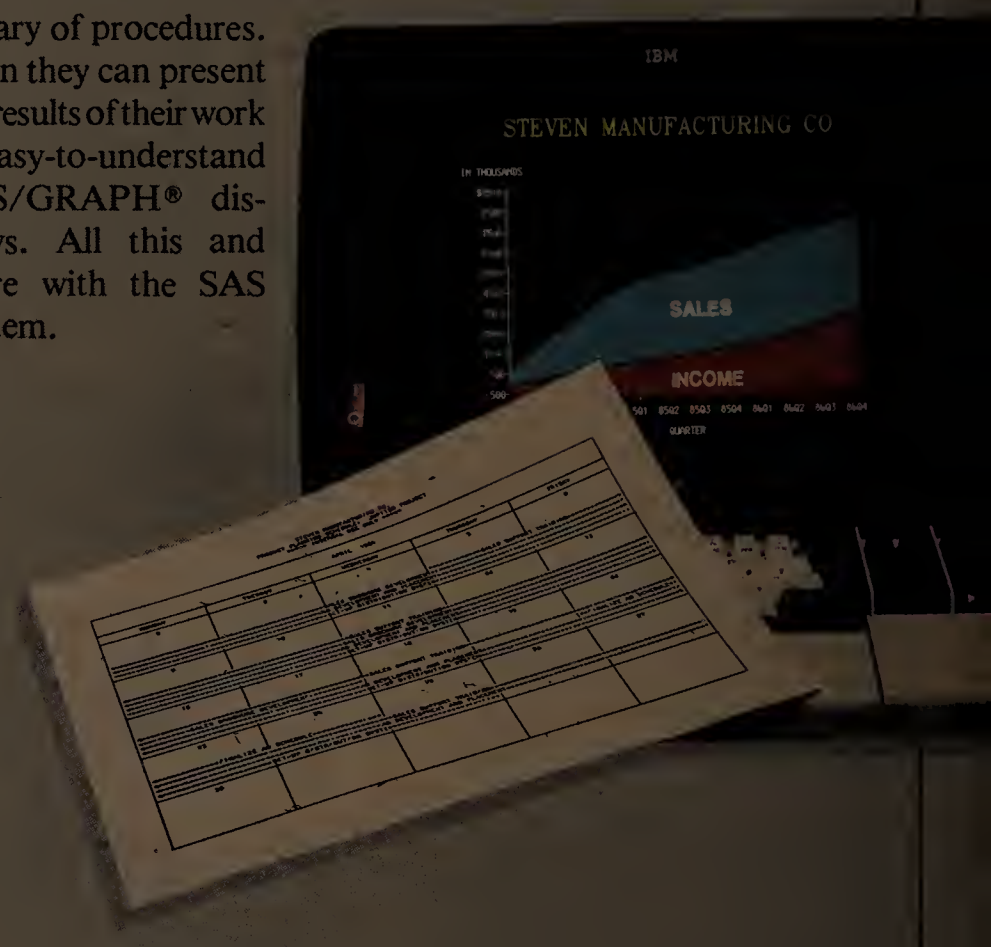

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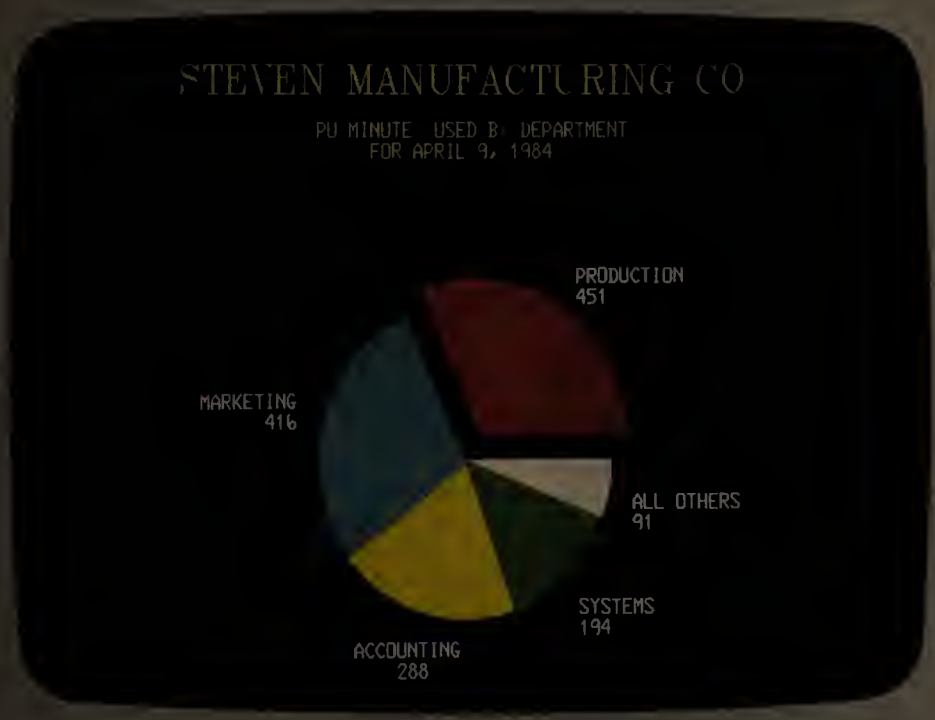
FOR APRIL 9, 1984

		CPU MINUTE			I/O COUNT	
DEPARTMENT	JOBNAME	NUMBER OF EXECUTIONS	SUM	MEAN	SUM	MEAN
ACCOUNTING	JACCT110	1	31.32	10.44	11372	3791
	JACCT210	7	38.97	5.57	34988	4995
	JACCT220	8	103.95	12.99	74237	9280
	OTHERS	25	113.76	4.55	56085	2243
HUMAN RESOURCES	OTHERS	18	31.00	1.72	50314	2795
LEGAL	OTHERS	16	17.00	1.06	6218	514
MARKETING	JMKTG170	3	31.35	10.45	13557	4519
	JMKTG200	9	145.36	16.15	159131	17681
	JMKTC215	8	82.33	10.29	43748	5469
	JMK7C220	7	67.01	9.57	132357	18908
	OTHERS	21	89.95	4.28	100880	4804
PLANNING	OTHERS	17	43.00	2.53	27479	1616
PRODUCTION	JPROD200	12	80.47	6.71	107271	8939
	JPROD500	7	170.00	24.29	89020	12717
	JPROD650	4	58.35	14.59	91561	22890
	OTHERS	24	142.18	5.92	108352	4515
SYSTEMS	JSYS525	4	38.47	9.62	22519	5630
	JSYS620	4	24.82	6.15	39212	9803
	JSYS700	4	47.36	11.84	41780	10445
	JSYS850	4	49.67	12.42	40258	10064
	OTHERS	17	33.68	1.99	114291	6723
ALL JOBS		222	1440.00	6.49	1366606	6156



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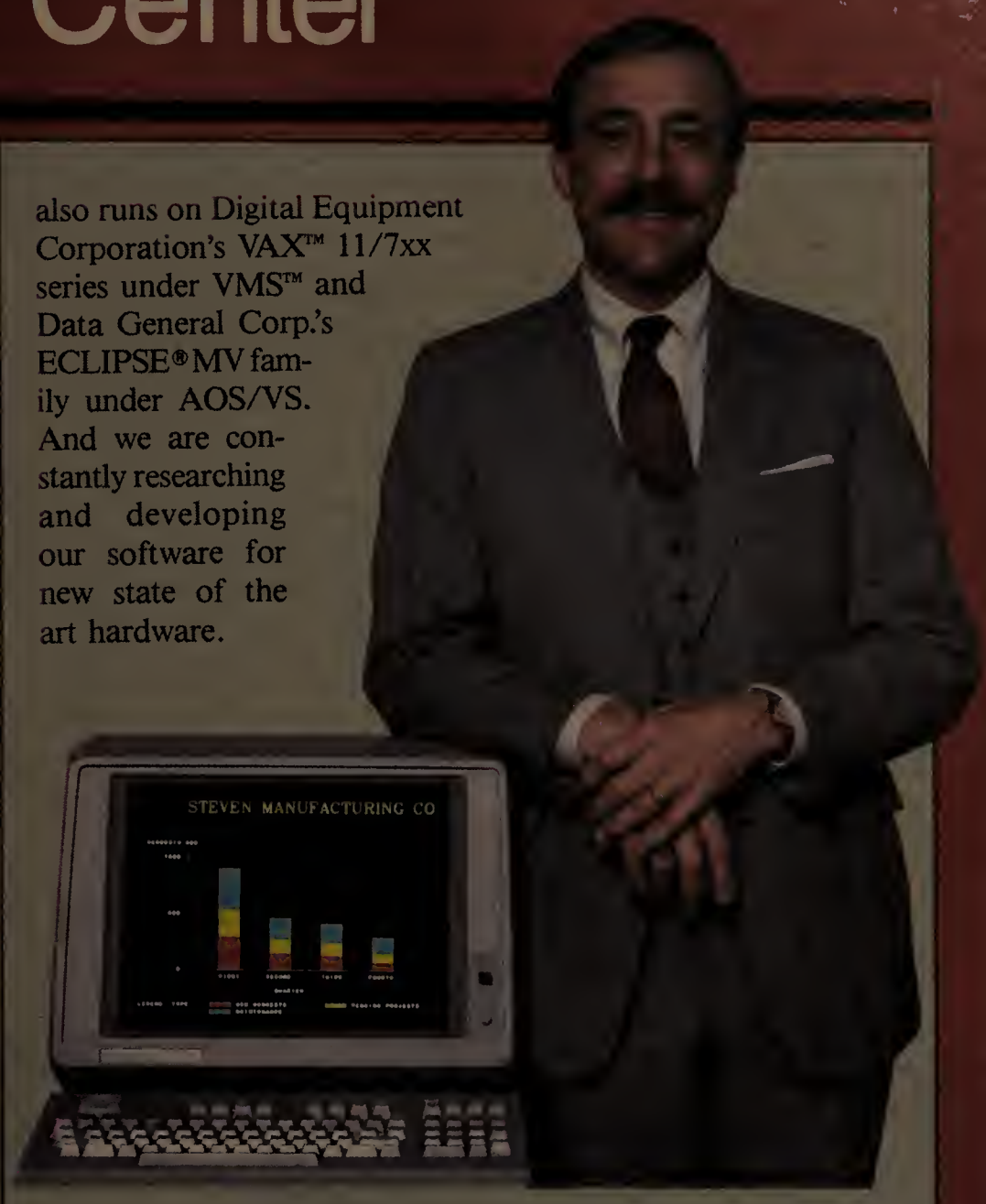

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forecast data upon which multi-million-dollar decisions are based with no controls whatsoever. The situation is further aggravated when other "modelers" begin to access the information of others without being aware of the actual status of the information. The situation becomes even more dangerous when more than one individual can enter into the same data file.

Systems development

The third area of end-user computing is systems development using fourth-generation data base managers. Most information services departments do not realize the large number of systems that offer benefits throughout the organization. Departments also do not take into account the amount of information not stored on the computer that is an integral part of both high-level and day-to-day decision making. If these systems were identified, the development backlog would easily exceed 10 years.

Users currently have only one choice, given the limited staff of the information services department: to develop the systems themselves. The irony is that these systems are often more beneficial than the systems being developed by information services, but they are not within the traditional realm of most information processing professionals. They are neither pure transaction systems nor pure control systems. They are systems oriented toward interactive decision making with a transaction-oriented front end to get the information into the computer.

There are a number of unattractive consequences that may result from end users developing data bases to enter and store data that go beyond the editing procedures found in modeling. The functional structure of organizations creates a certain parochialism. When coupled with departmental competition, this parochialism leads to a lack of cooperation concerning information of value to various departments. This situation can be further aggravated by conflicting perspectives on data structures, timing and goals. It is inevitable that with a laissez-faire central attitude, data duplicity grows when systems development projects move into the user area.

The highest degree of exposure exists in situations where end users develop systems that involve data of interdepartmental significance. The situation is likely to go unrecognized until the inevitable pockets of chaos begin to emerge, and upper management starts getting conflicting input caused by confusion and inaccuracy with the underlying data. The situation is likely to fester until patience wears thin, and improvement in the data infrastructure is demanded. At this point, a lot of effort is expended on the development of systems and models. The conversion to a more logical structure is monumental.

Limiting factors

The factors that cause problems in end-user computing tend to fall into three categories: lack of systems design concepts, improper use of a given tool and data management problems.

Systems expertise is lacking because users do not have enough training and experience. Additional training may not be the complete answer. End-user computing is not intended to turn users into systems personnel. The goal is to bring together users' knowledge with the tools and training that will help them perform their jobs.

Too much training and experiential learning can take time from functional tasks. The user may become too oriented toward the systems side, thereby losing the primary advantage of end-user computing. Fourth-generation and modeling languages are a step in the right direction, but until such languages develop further, we must continue to offer appropriate training and establish procedures that will ensure the proper blending of skills with those of professional systems people.

Improper use is the primary culprit in complex systems. A surprisingly sophisticated system can be produced with straightforward programming from new fourth-generation languages and modeling tools. The problems result when a spreadsheet is used where a financial modeling language is called for or a report writer is applied where a spreadsheet should be. The resulting program can confuse the most astute professional systems analyst.

Poor data management is the major cause of inaccurate results. Poor editing, duplicate data and maintenance nightmares caused by data embedded in programs are all the result of sloppy data management. The same problems that caused chaos within professional development departments because of a lack of data management will occur tenfold in the user environment. One reason is the alternative views that different user departments have of the data.

The task at hand is to remove these limiting factors without controlling. An environment must be created in which sound systems can be developed by individuals without data processing backgrounds, where the appropriate tools are used and where the data is properly managed so that system activities performed by different users according to their own time frames remain coordinated.

What is needed is the creation of an environment in which data processing professionals and end users each perform the function they are best equipped to handle while cooperating to reach mutual goals. Organizations need an "architecture" that brings end-user computing into the mainstream of data processing.

The infrastructure must permit a diverse group to perform independent programming activities. Build-

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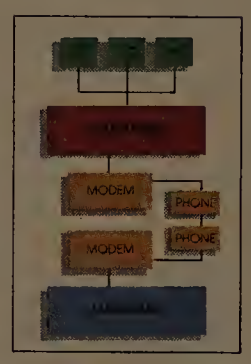

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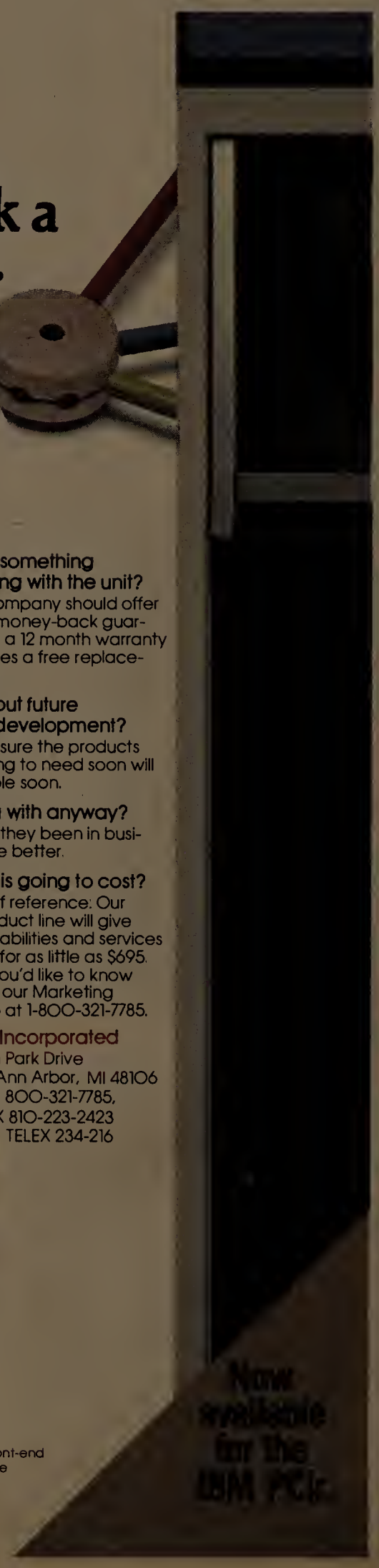

ing this framework is the new role of the information services department as it relates to end-user computing. The methodology to develop the architecture must, above all, be practical. Although it might be ideal to develop the architecture on a companywide basis, for most of us this approach is unrealistic. Not only would time pressures not permit, but not all end users are equally interested in computing. The methodology must produce a workable result at the departmental level.

A department can be defined essentially as any group of functions that report to one individual. Obviously, this definition can apply to anything from the entire company to the mail room. The key is that the architecture must relate to the areas of responsibility of one individual, not a committee cutting across functional lines. The architecture must define how this department, for which the individual is accountable, will use information technology to improve business results.

Basing the plan on an individual's area of responsibility, as opposed to a committee, will pave the way for the transition to end-user computing. The level to which it applies, be it the president or the cost supervisor, does not affect this principle. The level does, however, influence the effectiveness of the resulting data model. If applied to its full extent at too high a level, it will tend to encompass too broad an area and require too much effort. If applied too low, the resulting data model will be too narrow a view.

The "architecture" for end-user computing must relate to the areas of responsibility of one person, not a committee cutting across functional lines. The architecture must define how the department, for which the individual is accountable, will use information technology to improve business results.

Although the ideal will always be the total company plan, the practicalities of the situation must prevail. The scope should be determined by available time for planning and the individual's commitment to the data modeling project. If the departments can be selected in such a way that much of the data is self-contained and good data modeling techniques are used, the results will not be adversely affected.

End-user architecture

Following are the steps involved in developing an end-user computing architecture:

- Identify the key result areas.
- Identify key result processes.
- Identify limiting factors.
- Identify computer systems.
- Identify information requirements, tools and equipment needs.
- Develop departmental data base.
- Identify support systems.
- Assign responsibilities.

Although each step is presented as distinct and sequential, in practice they become iterative. This is especially true of steps two through five, which are often better handled iteratively, one key result process at a time.

The purpose of the first step is to focus attention on attacking the right areas, to direct resources to areas of maximum business benefit. A "key result area" is an area in which a department must excel. Other areas are those in which performance can be mediocre, with excellence still achievable by the department as a whole. A key activity for a sales department is generating orders; an area not essential is controlling salesmen's expense accounts. A sales department that excels at generating revenues but is only average at controlling expenses will probably still be considered "excellent" in overall performance. A department "average" at generating orders but excellent at controlling expenses is still only an average department.

The job of controlling salesmen's expenses may indirectly be a key activity for the financial department. That department's goal, however, must not be to attempt to force the sales department to use top resources for this activity, but to provide the necessary reporting so that by doing an average job with average resources, the sales department will be doing an excellent job relative to the rest of the industry.

The second step in developing an end-user computing architecture is to identify the processes through which the department produces the key results. The methodology involves more than simply identifying how the department goes about trying to achieve excellence. Of particular importance is not the how but the why. The reasoning behind the process is the key to improving it. Some procedures are valid, that is, they are an integral part of producing the desired result; others are invalid, unquestioned remnants of the past or misguided but well-intentioned efforts that do little but create needless overhead. Obviously, valid procedures must be facilitated and the others eliminated.

Possibly of more importance, but more difficult to identify, are potentially valid procedures which, for one reason or another, are not being performed. Identifying these processes is a true creative effort and the most demanding for the analyst.

Identify limiting factors

Up until this point, the plan has, at least in theory, nothing to do with computer systems per se, but is a true analysis of business objectives and processes.

This step consists of identifying

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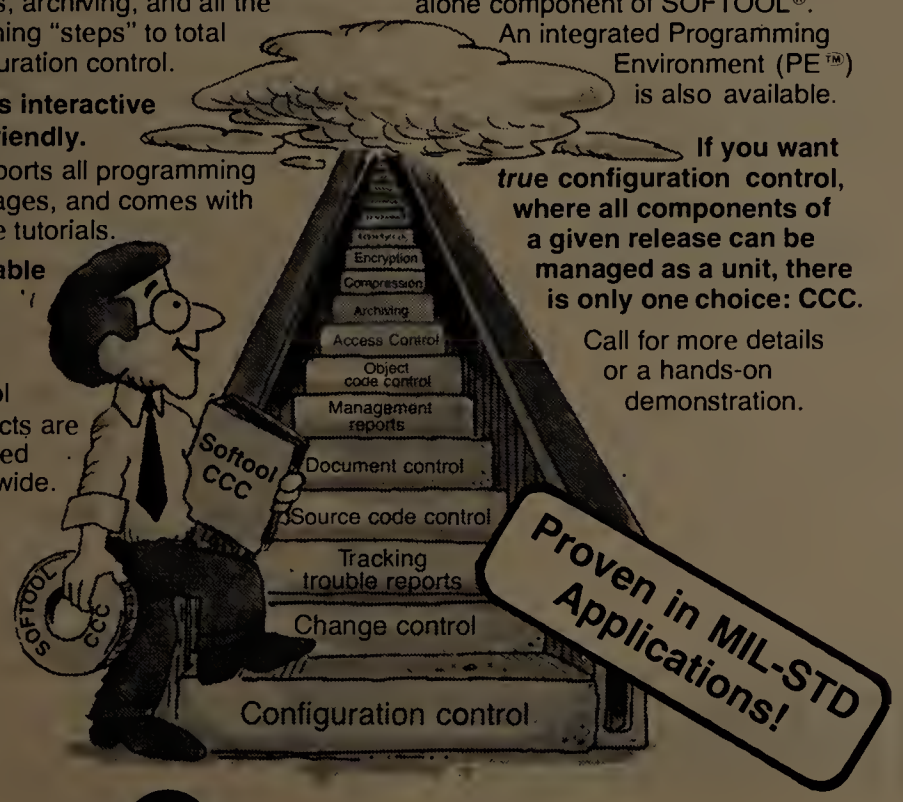

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the limiting factors of each identified process, both existing and nonexisting, that can be removed through information technology. These limiting factors tend to fall into the following categories:

- Manual effort.
- Timeliness.
- Data availability.
- Presentation of data (graphics).
- Tracking of multiple relationships (modeling).
- Relationship identification (statistics).
- Available expertise (artificial intelligence).

The first three categories are familiar to the information processing industry. The fourth is becoming familiar, and the remaining three are less familiar but increasingly important. The effective information processing consultant must be skilled in all seven areas.

The data processing industry is very comfortable in attacking the problem of excessive manual effort, especially when it relates to transaction processing. Fewer and fewer key result areas are, however, susceptible to this type of automation. One does find this limiting factor in key result areas involving accumulating and distilling information, not transaction systems. The information is available, but it is not easily accessible. It is scattered among various reports, the back of envelopes or tucked in filing cabinets.

There are two types of processes that must be segregated because they are susceptible to often entirely different technologies: manipulating data and data collection. Manipulating data is a function of language and data structure. It is generally the province of fourth-generation languages and data bases. Data collection, in addition to traditional methods, involves the use of hand-held terminals, wands for stock checking and so forth.

One word of caution concerning excessive manual effort is that by definition, the work could be performed manually if it were worth the effort. If a procedure is not being performed because of this effort, then the benefits, by definition, are less than the costs of the effort. The reasoning behind the fact that the effort is not being expended should be closely investigated. Often, what appears to be an effort problem is in reality caused by other limiting factors and is susceptible to different tools.

The second limiting factor, timeliness, not only prevents nonexistent but valid processes from occurring, but also reduces the significance of many existing procedures. A process is valid if the information it produces exceeds the costs, yet it may not give the decision maker the time to use it to its fullest extent. Often, a process whose limiting factor at an initial glance appears to be excessive manual effort may in fact be limited by timeliness.

Lack of available data is one of the most persuasive limiting factors. Frequently, the information is in reality quite available, but the user was never informed. Often, quick and dramatic benefits can result by simply setting up the proper communications mechanism with the user community. More commonly, however, making the data properly available requires significant costs.

The fourth limiting factor is presentation. The information is available and presented in a timely fashion, yet it does not properly convey the underlying patterns and relationships. The obvious solution here is graphics. Typically, we think in terms of static graphics, but we should not ignore the dynamic graphics that are becoming increasingly feasible with advances in both hardware and software.

The motion of a coordinated series of graphs can convey changes over time with far greater impact and with greater comprehension than can a series of static graphs or even a three-dimensional graph. Movement can often add a necessary third or fourth dimension that makes the difference between a discernible pattern and one that remains hidden to the visually oriented human mind.

The tracking of multiple relationships is gaining increasing attention with the advent of low-cost microcomputers. Here, the relationships are fairly well defined, or at least well enough to be of practical significance. Unfortunately, they are numerous, and the impact resulting from the changes in one variable cannot be readily perceived.

The next limiting factor is often a necessary prelude to the establishment of the above models, that of identifying relationships. A decision maker may be reasonably confident that a relationship exists yet be quite uncertain as to the strength of the relationship relative to the other variables involved. Statistical analyses are often the rule. A word of caution is that statistical techniques have assumptions built into them that are rarely entirely fulfilled in the real world. One must tread cautiously in this area. It is better to steer away from these areas unless properly prepared.

The final category of limiting factors, lack of expertise, involves the somewhat esoteric area of artificial intelligence. It may be premature to look to artificial intelligence at this time as a provider of expertise. Practical business-oriented expert systems are still several years away. It is, however, important to identify the need early so that as the situation develops, we will be attuned to significant advancements as they relate to our organization and will be prepared to use them.

One limiting factor that is not dealt with directly is lack of time of key people resulting from necessary effort expended on nonessential but required activities. This includes a host of sundry items that require a large number of resources such as

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producing status reports, attending meetings, communicating with peers, travel and so on. The goal is not so much to improve the results, although this is often a natural by-product, but to produce the results in a more efficatious manner. These areas tend to fall in the office automation arena. Improvements are being made through efforts in electronic mail, document processing, teleconferencing and electronic calendars.

The next step in developing the architecture is to identify the computer systems that can remove the limiting factors of each process. At this point, data collection systems should not be addressed unless the collection of data is actually a key result area for the department or is an integral part of a key result area

Small projects provide the design flexibility to take advantage of new technological developments; they pose fewer risks and provide benefits sooner than a smaller number of large projects.

such as in transaction control; they are segregated into the support systems section. This section is primarily oriented toward data manipulation systems, as they are generally the ones that directly affect key results. The goal is to produce a series of such systems, each of which is as small as possible, yet stands on its own merits in terms of costs and benefits.

The orientation toward small systems is important for several reasons. The first is that the user does not have a large pool of programming resources upon which to draw, and data manipulation systems are usually better developed by the user. Second, large systems lean toward the complex, requiring significantly greater systems and technical skills, again violating the reasoning behind end-user computing. Finally, small projects, if implemented within the context of a larger architecture, provide the design flexibility to take advantage of new technological developments, pose fewer risks and provide benefits sooner than a smaller number of large projects. The cost of retrofitting systems written in fourth-generation languages is only a fraction of the cost of retrofitting systems written in the more traditional languages.

The identification of a series of small systems that can stand on their own merits, be implemented one at a time and build toward an integrated whole is an art.

One approach is to take each limiting factor for each process and identify the subsystem that would remove it. These subsystems can then be combined into systems that can be implemented. It will never be possible to eliminate large system development projects entirely, but it must be a goal, especially in the area of end-user computing. Large systems are generally best handled by the development staff, which can devote full time to the project.

Once the systems have been identified, the next step is to identify the requirements. This includes the information needed as well as the tools, such as modeling languages and graphics packages, and equipment needs that would be required in order to implement the systems.

The informational requirements form the basis for the data base, which will hold the entire effort together. These requirements consist basically of the application view of the data. One should not limit the definition of data requirements to that which is readily available. After support systems identification, a business decision must be made as to whether it is worthwhile to spend the effort in collecting some less-accessible data.

Once the information requirements have been identified, the next step is to develop the departmental data base, often called the decision support data base. This data base holds the entire process together. As support systems are developed to capture data, either by the information services department or the end user, the data must fit into the overall model design.

There should be no need to enter duplicate data; all data is recorded and documented. Controls can be established so that as systems are set up to fill the data base, the testing and procedures can be reviewed by information services to ensure that data integrity will be maintained.

In other words, all systems that modify the departmental data base must be turned over to "production" in the same way that any system developed by the system development group would have to be turned over to an independent group for movement into production. To do otherwise is to invite chaos.

More freedom

Of course this does not include truly "personal" systems where the data is not shared. Properly done, this control, as opposed to limiting the end user, creates a certain freedom.

Once the data model is established, users need not spend time on information management, a function in which they are neither particularly qualified nor interested.

If the information services department can maintain responsiveness, the central management of the data base is looked upon quite favorably by the end user. The end user can see

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the benefits of sharing data and the need for coordination. There is a yardstick with which to measure progress, a key motivator on everyone's part. Development by all groups fills in additional pieces of the data base.

The data base is established by combining the application views, preferably through a normalization process, into subject data bases. It is the subject data bases that are "filled" through the support systems. Often, these subject data bases cannot, for some applications, be directly accessed because of performance considerations. Special application data bases must be created. These should always be loaded through the subject data bases. Support systems will load data into the subject data bases, and then the specific application data bases can be loaded from the subject data bases with additional support systems.

The subject data bases, because of the somewhat isolated departmental orientation, will be incomplete. As the architecture for additional departments is developed, the tendency will be only that segments or tables in a relational scheme will be added to as opposed to changing the underlying structure.

Identify support systems

Very often the information required to support a system that addresses a key result area is not readily available to a fourth generation of modeling languages. In these cases, one must develop support systems to make it available. These support systems consist of two general types. The first is the extraction of data from existing production data bases and files to create the data bases that can support the previously identified systems. The second is the development of a system to capture data that currently goes unrecorded. These systems essentially fill in the departmental data base.

There are two reasons for separating support systems from systems that directly address key result areas. The first is that support systems can provide pieces of information that are used in several key result systems. The support system cannot naturally be attached to one of these key result systems. The second reason is that the technical skill level tends to be quite different from key result systems. Key result systems usually tend toward the manipulation of data in an interactive mode, the forte of end-user computing. Data collection not only is more technical, using such devices as data entry screen and bar code readers, but tends toward the very purpose of the information services department: the protection and integrity of information. The user will tend to orient himself, both in skill and interest, toward implementing key result systems, while the information services department will spend the majority of its time on the support systems.

At this point, we have a set of key result applications using specifically identified tools that manipulate data, a set of subject and application subject data bases supporting these applications and a set of support systems that collect data and fill data bases. The remaining step is to assign implementation responsibilities and create an implementation plan based upon priorities and prerequisites. That which is better done by the user is assigned to the user departments, and the applications requiring more technical skills are assigned to the information services department. Any necessary training and equipment is added, and a logical progression of systems is created. A flexible schedule is produced for implementation.

In the short term, it may be more efficient and effective for the information services department to develop a series of reports or a model, considering either the experience level of the user or the structure of the underlying data. In the longer term, however, user training or the structuring of a data base to simplify reporting will pay greater dividends. We must also recognize that various departments will be in different stages of development. Consequently, we should avoid blanket statements that information services will not do data manipulation programming or that the user will develop no support systems.

The basic goal is to use all resources to the maximum business benefit; flexibility is essential. The information services department will undoubtedly perform functions for the sales department that may be performed directly by the engineering department. The objective is not to keep everyone moving at an equal pace, but to keep everyone moving in accordance with their abilities and ensure steady progress is maintained.

The resulting architecture should coordinate the efforts of both the end user and the information services department. It identifies those areas in which an end user can perform most effectively, what is needed to expand the areas of effectiveness and provides the information services department with the material it needs to create an environment that will allow the organization to optimize its application of computing technology.

As time goes on, the information services department will be more of a consultant who also coordinates and consolidates plans developed by the user into coherent, effective and efficient data bases.

About the author

Ronald A. Zink is manager, business information and analysis, at Beecham Products in Pittsburgh. He has been involved with end-user computing, both as an end user and data processing professional, for the past six years.

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MICROCOMPUTERS

SMALL TALK
Eric Bender
CW Senior Editor

Software vendors buck site licensing

Dragging their feet all the way, microcomputer software publishers will be forced to sign site license agreements with big customers.

For many large organizations, site licensing poses obvious potential advantages — simplified acquisition practices, a simple way to squash the software piracy that comes so naturally to droves of office workers and better discounts.

On the vendor side, however, discounting is not the only worrisome issue. Another prime concern is conflict with the computer dealers who still represent the main channel for software sales. Suppliers also puzzle over legal questions and means of internal distribution.

Peachtree Software, Inc. currently sees most demand for site licenses from colleges and universities, but large business firms will not be far behind, general manager Larry Smart said. "A lot of people are requesting it," he said. In time, customer demand will force Peachtree to sign such agreements, he predicted. "I don't see any way around it."

Site licensing is "one of the most popular questions when we talk to large corporations or other large organizations," said Jeff Raikes, Microsoft Corp.'s manager of applications marketing. "They see that as one of the vehicles through which they can get a good price." He also noted that the site licensing issue arises naturally as personal computer networks spring up.

Microsoft is looking at various site licensing approaches, Raikes said. Like other vendors, he emphasized that "no matter how we set up site licensing, we would want to work with retailers."

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Lisa, Macintosh get software

LAS VEGAS — Apple Computer, Inc. unveiled Lisa 7/7, an integrated software package for the firm's Lisa personal computer, at the National Computer Conference here recently. It also announced Pascal and terminal emulation software for the Macintosh.

Apple's new Lisa 7/7 program combines the seven original Lisa office system applications into a single software package, according to Apple Chairman Steven Jobs, who spoke at a press briefing here.

The applications have been rewritten to provide greater integration and other enhancements, Jobs said. The seven functions are Lisaproject, Lisawrite, Lisacalc, Lisaterminal, Lisalist, Lisagraph and Lisadraw. The new package will cost $695 and should be available by August, Jobs said.

Among Macintosh software introductions, an interpretive Pascal language will be offered for $125 in late August, the Cupertino, Calif., manufacturer said.

Macintosh Pascal reportedly contains virtually all of the functions and standards of Ansi Pascal, but does not fully support all Macintosh user interface features. Apple plans to release a Pascal-based development environment by year-end.

The new Macterminal program allows Apple systems to emulate an IBM 3278 terminal linked to a mainframe computer through either the Appleline coaxial attachment unit or the Apple Cluster Controller protocol converter, the company said.

Operating with a modem, Macterminal is said to provide asynchronous communi-

See **TOOLS** page 64

Laptop products make NCC debut

LAS VEGAS — Despite disappointing sales thus far, manufacturers remain optimistic about the lap computer market's future, and several vendors unveiled new lap computer products here earlier this month at the National Computer Conference.

"Users do not yet understand the value of the lap-size microcomputer," commented Thomas Priestley, general manager at NEC Home Electronics, Inc. "Vendors must educate them."

NEC Home Electronics introduced products that brought desktop functions to its PC-8200A. Among these was a portable 3½-in. disk drive that weighs less than 8 lb and has 320K bytes of storage and an optional battery pack. The drive costs $799; the batttery pack sells for $100.

The company also announced a CRT adapter that attaches a PC-8200A to a 16-color, 40-col. by 24-line screen with 256-by 192-dot resolution. NEC Home Electronics introduced its PC-8027A transportable dot matrix printer, which reportedly

See **LAP** page 64

Vendors debate user interfaces

By Edward Warner
CW Staff

LAS VEGAS — What's the best microcomputer user interface: mouse, touchscreen or voice recognition?

Representatives of the microcomputer makers whose names have become synonomous with those technologies, presenting their cases to a session at the National Computer Conference here, all agreed that the keyboard will remain the standard user interface for the foreseeable future.

But the keyboard is not the best interface possible, argued Apple Computer, Inc.'s Bruce Tognazzini, an applications analyst, who said many older and often powerful executives are put off by the keyboard, sometimes because they cannot type. Their abhorrence of the keyboard has become "a badge of status," he said. "In the meantime, it's easier for voice recognition to find its way into the conference room."

Voice recognition's proponent on the

See **MICRO** page 63

MICRO BITS/THOMAS W. MADRON

Despite present claims, micro-mainframe links remain undeveloped

Although some claim that all the products necessary for appropriate micro-to-mainframe connections are already on the market, such statements are clearly premature.

Randy Broweleit, chairman of the Business Library, Inc., maintained that present products provide terminal emulation, electronic mail, access to third-party data bases, reduction of mainframe data processing and use of data by different applications [CW, June 11].

However, the micro-to-mainframe connection is still undeveloped. In fact, in many large organizations, those five reasons for connection are probably not even the most important issues. Some important objectives are:

- Ability to extract data from the corporate data base, download it, massage it and produce reports locally.
- Composition of documents locally and the ability to transmit them to a target system, which might be an electronic mail system, an automated composition machine or some other expensive (or esoteric) device.
- Use of the mainframe as an archival peripheral for the micro.
- Efforts to make the mainframe more user-friendly through the use of an off-line transaction setup system that presumably leads to a reduced load on mainframe resources.
- Ability to act as an intelligent node in a distributed processing environment.

Several of these uses are similar to those identified by Broweleit, but this is clearly not the same list. Moreover, existing products do not accomplish all these tasks, although some on the market and others on the drawing boards appear to offer partial solutions.

One fundamental requirement is the capability to emulate some kind of terminal. Many products provide emulations of popular Ascii devices, and a growing number emulate IBM 3270-type terminals. This week's column will address asynchronous Ascii emulations, while a subsequent piece will deal with 3270 products. Not all the products described are available for all microcomputer systems, so they may not provide a solution for you.

The choice of asynchronous, Ascii terminal emulators is very broad, with an extremely wide variation in type and quality of programs.

The simplest asynchronous communications program is sometimes referred to as a dumb terminal program. Such a program simply gives the user access to the asynchronous communications hardware and acts like a simple teletypewriter machine — it cannot transfer files, address the screen or provide other services that might be necessary.

On the other hand, if all you have to do is communicate with a large mainframe system as a dumb terminal, then this kind of program is for you. It has the further advantage of

See **LINKS** page 64

Madron is manager of computer services at North Texas State University, Denton, Texas.

Supermicro arena seen as battleground for rivals AT&T, IBM

By David Olmos
CW Staff

NORWALK, Conn. — The supermicrocomputer arena will provide the first battleground for corporate Goliaths AT&T and IBM in the computer market, a rivalry that threatens some industry Davids, according to a recent market study.

The AT&T-IBM competition signals the beginning of a coming boom period in the supermicro market, predicted International Resource Development, Inc. (IRD), a market research firm based here.

From 1983 to 1993, supermicro shipments will grow from 52,500 units representing $780 million to 850,000 units and $5.4 billion in constant 1983 dollars, the study stated.

According to the study, a supermicro differs from a microcomputer in that it supports multiple users and provides a more powerful operating system and applications.

Spurring market growth

Recent entries by IBM and AT&T into the supermicro field will help drive the market's growth, the study said. Decisions by AT&T and IBM to design their supermicros for easy integration into offices with personal computers or minicomputers will spur supermicro sales, the report said, but may spell trouble for other supermicro manufacturers, such as Altos Computer Systems, Inc., Fortune Systems Corp. and Tandy Corp.

The study pointed out that IBM announced its 5362 "Baby 36" system (which IRD defines as a supermicro) just one week after AT&T announced its 3B2/300 supermicro last March. The report referred to speculation that IBM may have sped up development of the Baby 36 to prevent AT&T from gaining a foothold in the market.

AT&T's entry poses a considerable challenge to other supermicro companies, but the communications giant must "overcome major weaknesses as it begins to market computers," the study said.

Among AT&T's advantages are its Unix operating system, its 32-bit chip manufacturing capability and its terminals and communications products.

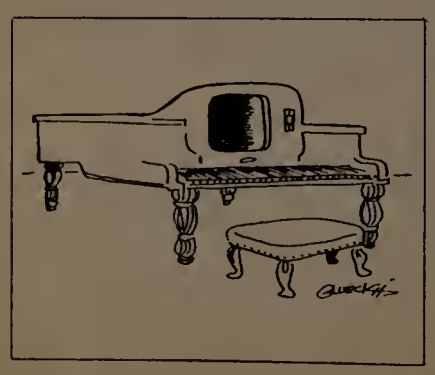
The study also concluded, however, that AT&T may have difficulty gearing up its production capacity and straightening out personnel problems in its marketing division, said to experience high turnover among key executives.

IBM is well-positioned to take a big bite out of the supermicro market, the report found. The 5362 can run System/36 and System/34 applications software, and because of the large installed base of System/36s and System/34s, the 5362 will be a logical add-on to departments or remote office sites wanting to automate and retain compatibility with a main office. Another IBM strong point is the availability of conversion aids to migrate software from smaller IBM systems to the 5362, according to the study.

But IBM's entry also has some weaknesses, one of which is price, the report stated. The 5362's typical configuration price of $37,000 is "significantly more expensive than most supermicros on the market," the study said.

In addition, "IBM hasn't figured out where its Personal Computer should fit into the system, even though it is marketing [Personal Computer] compatibility as an incentive to buy the 5362."

The report and more information are available for $1,650 from IRD, which is located at 6 Prowitt St., Norwalk, Conn. 06855.



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This means he needs consistent and reliable capability to access [illegible] In a matter of moments he can get his hands on the information he seeks in his [illegible] computer.

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As a member of the corporate financial staff, he is intimately involved [illegible] when appropriations, budgeting and [illegible] does everything he can.

"I brought a Hayes 1200B into the company. Then I spent at least two weeks trying to find out where it would be incompatible with other microcomputers. The system passed my compatibility test with flying colors."

Then I tried to interrupt its transmissions by using [illegible] line [illegible]

"I'd hate to say how many communications packages we looked at until Smartcom II came on the market." In the past, his staff was forced to dig through file cabinets for [illegible] they needed. Now he [illegible] and uses [illegible]

Did that interrupt the modem? Not one bit. The transmission was just perfect in every respect.

"In my evaluation of the 1200B and Smartcom II, I expressed wonder at why someone would even consider anything else for telecommunications on the IBM PC." Of no less importance is the system's ability to transfer files between two brands of microcomputers [illegible] every month.

MICROCOMPUTERS

Macintosh seen booming; 1984 sales predicted at $500 million

SAN FRANCISCO — More than a quarter of a million Apple Computer, Inc. Macintosh computers will be sold this year, an audience of software developers and hardware vendors was told here last month.

Egil Juliussen, chairman of Future Computing, Inc., a Richardson, Texas-based market research firm, said that combining Macintosh sales with shipments of some 65,000 Apple Lisa computers in 1984 will bring the installed base for the Apple 32 family of products to almost 350,000 units by year-end.

Speaking at Future Computing's Macforum, the market researcher predicted Apple will receive $500 million from Macintosh sales during 1984, with a further $200 million coming from Lisa products.

Expected sales

Within 18 months, he asserted, Apple can expect to reap $800 million a year from Macintosh sales, while Lisa can be expected to bring in $400 million. The combined installed base for Macintosh and Lisa in 1985 will be 600,000 units, he contended.

Juliussen also promised rosy times ahead for Macintosh software developers, predicting that the Apple 32 software market will climb to nearly $150 million at year-end from a January 1984 base of $10 million.

With sales of Macintosh doing well, he added, the product should begin to replace the Apple IIe at the low end of the office market.

Making inroads

According to Future Computing, the Macintosh is making inroads into all types of markets, with 22% of April sales to professionals, 17% to small businesses and 13% each to medium-size businesses and Fortune 2000 companies. Educational institutions accounted for between 6% and 11% of Macintosh sales, Juliussen reported.

Apple received its largest ever product order in May, when the University of Texas at Austin requested 13,000 Macintoshes, according to a spokesman for the manufacturer.

The reasons for the Macintosh's popularity on college campuses were addressed at the conference by Michael Carter of Stanford University, part of Apple's 24-member University Consortium.

Macintoshes help to promote the use of appropriate technology on campus, integrate personal computers into academic and administrative activities and build an information technology base in educational institutions, Carter said.

Over 2,000 orders for Macintoshes were placed in the first nine days of the consortium at Stanford, according to Carter.

Tricep out from Morrow

SAN LEANDRO, Calif. — Morrow Designs, Inc. has announced Tricep, a four- to eight-user microcomputer system that runs Unisoft System Corp.'s version of the Unix V operating system.

Tricep includes a Motorola, Inc. 68000 microprocessor operating at a speed of 10 MHz and 512K bytes of ran-

See **TRICEP** page 62

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Hayes

Quotes reprinted from product review in *LIST: The Business Software Magazine*. June, 1984. Pages 26, 28-29.

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"Creating the Future in Computer Communications"

Exec system debuts; offers OA functions without keyboard

LAS VEGAS — An executive workstation system designed to bring office automation functions to top managers without requiring them to type or learn computer commands was introduced at last week's National Computer Conference here by Santa Barbara Laboratories, Inc.

Santa Barbara's Centerpoint 1000 system gives executives touch-screen access to scheduling, dictation and voice messaging, telecommunications, data base, calculator, spreadsheet, color graphics and other functions, according to Santa Barbara Laboratories' President John Conroy.

Conroy said the Centerpoint 1000 allows executives to work by touching familiar-looking icons on the screen. For example, dictation functions are reached by touching an image of a tape cassette, while files are accessed through representations of a file drawer and individual file folders. This approach was chosen because the target executive "typically is successful and resistant to training and to changing the way he works," Conroy maintained.

Links consoles

The system design links an executive console (with optional IBM Personal Computer-compatible keyboard) to a secretarial console. Both displays reportedly feature 480-by 512-pixel resolution, supporting 16 colors.

A basic configuration, with both user consoles, an electronics console (with boards providing Intel Corp. 80186-based CPU and 512K bytes of random-access memory for each user, along with shared 80M-byte hard disk drive and 45M-byte cartridge tape drive) and proprietary software, will cost $30,000, Conroy said.

Videoconferencing capabilities can be added to the system, with conferences set up and run under the control of the executive workstation, according to Conroy. A video system with five-axis color video camera, monochrome camera, electronics and supporting software will cost $10,000, he said.

A personal computer mode allows Centerpoint 1000 to load and run Microsoft Corp. MS-DOS and Digital Research, Inc. CP/M 86 programs, Santa Barbara said. Clusters of Centerpoint 1000s can be connected via an Ethernet local-area network, according to the company. The systems also offer Digital Equipment Corp. VT100 emulation, while development of IBM 3270 emulation is under way.

A prototype system debuted at last year's NCC, but commercial system details and pricing were released this month, Conroy said. First production shipments are expected to begin late next month.

Santa Barbara Laboratories is located at 224 Anacapa St., Santa Barbara, Calif. 93101.

TRICEP from page 61

dom-access memory, which can be expanded to 2M bytes of memory, Morrow said.

Other features reportedly include four to eight RS-232C serial ports; a Centronics Data Computer Corp. parallel printer port; hard disk and floppy disk controllers; mass storage of 16M, to 128M bytes; one to four 400K-byte, 5¼-in. floppy disk drives; and one to four 1.3M-byte, 8-in. floppy disk drives.

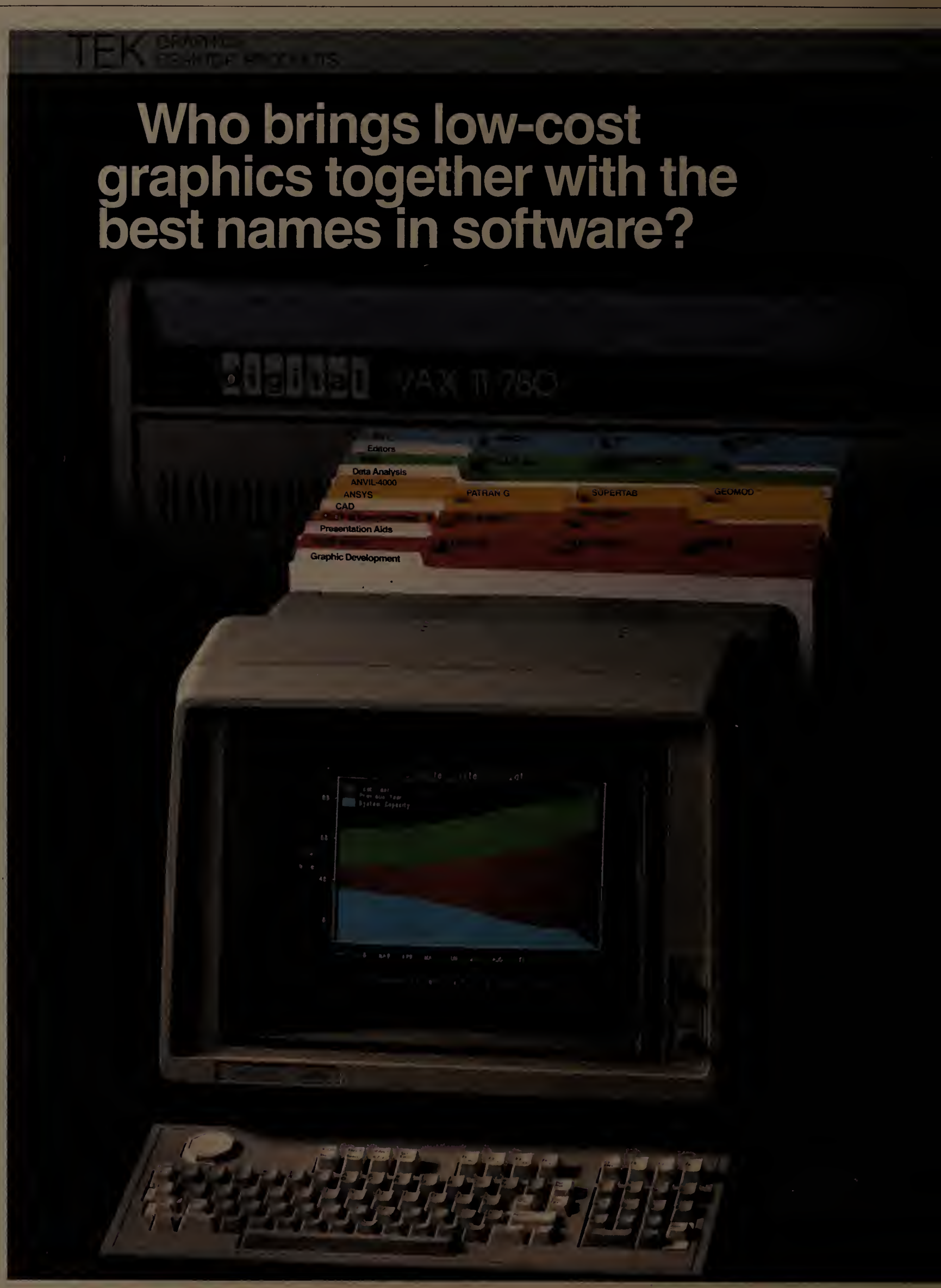
Unisoft's Unix, compatible with AT&T's Unix System V, includes record locking and IEEE floating-point capabilities, Morrow said.

The system bundles a C compiler and offers optional Basic, Cobol, Fortran 77, Ada and Pascal languages, according to the vendor.

Tricep's serial I/O controller is said to communicate at a speed of 19.2K bit/sec with terminals and printers.

An entry-level Tricep system sells for $9,000.

More information is available from Morrow, located at 600 McCormack St., San Leandro, Calif. 94577.



SITE from page 59

Although relatively few software vendors are signing contracts now, "clients are interested in site licensing [agreements], with dealers involved either in sales or support or both," said Tony Morris, president of Morris Decision Systems, Inc.

Morris noted that vendors are just beginning to explore both legal and physical distribution issues. Site licensing for micro software raises new issues not faced in mainframe software, which involves very few packages at any site, he pointed out. "The business problems are well behind the technical problems," he said.

"Site licensing is a hot trend and it's going to continue," said Paul Jenusaitis, co-owner of Computerland of Connecticut stores. "It's very difficult [for vendors] to come up with the right marketing approach; they're breaking virgin ground."

Multimate International Corp. President Wilton Jones said his firm decided to go ahead with site licensing about seven months ago. Agreements could cover unlimited use, the total number of personal computers within the organization, the total number of Multimate users or whatever else the customer could quantify and put on the dotted line, according to Jones.

"We found that major corporations don't know how many [personal computers] they have or how many Multimate users, and they're afraid to write dollars into the contract," according to Jones.

Another limitation is that "very few corporations want to buy in sufficient quantities for a master disk," said Chris Christiansen of the Yankee Group. Companies typically purchase several hundred copies rather than thousands, Christiansen commented.

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MICRO from page 59

panel came from Texas Instruments, Inc., whose Professional Computer offers voice recognition with a vocabulary of 50 words. Roger Roberts, manager of software market development for TI's Data Systems Group, pushed voice recognition as the "most natural interface of all . . . especially since so many use their voices in their work."

But Roberts acknowledged that voice recognition must be supplemented by "software that will guide the user through the query."

That software would be a natural query language displaying a series of commands on the screen, prompting the user.

Apple's Tognazzini, meanwhile, spoke out in favor of the mouse. Tognazzini said his firm chose to adopt the mouse based on its own research and that of Xerox Corp., which pioneered devices for use with its Star workstations. Xerox tested the mouse against all other interfaces, he said, and "what they found in speed tests was that the mouse outperformed all these [interfaces]."

Tognazzini and Roberts agreed that, whatever interface was chosen, it must tap the user's intuitive powers. Tognazzini admitted that simple pointing — as used in touch-screen technology — is a powerful intuitive action. But he added that Apple's tests showed that microcomputer users typically execute 1.5 million commands in the course of a year and asked if they would want to lift their arms 1.5 million times a year to point at a screen.

Hewlett-Packard Co.'s Bob Puette, general manager of its personal office computer division, defended the touch-screen technology in use on the HP 150 and other systems. "It's a very intuitive interface," he said. "You get what you see."

Puette also pointed out that, unlike the mouse with its few moving parts, the touch screen is solid-state and therefore likely to be more reliable.

Puette noted that Stanford University testers found that touch technology worked best of any of the nonstandard interfaces, when combined with a keyboard. He added, echoing the other participants, that "the keyboard will continue to be standard, particularly for text input."

None of the panelists favored his firm's special user interface for every application, however. Apple's Tognazzini noted that a graphics tablet would be best for design functions, and Roberts of TI admitted that his firm's own tests found that the mouse was the best interface for use by children.

LAP from page 59

prints at a speed of 105 char./sec and costs $199.

NEC Home Electronics is located at 1401 Estes Ave., Elk Grove Village, Ill. 60007.

Epson America, Inc. displayed its recently released Geneva/PX-8 lap computer. This machine features a Zilog, Inc. Z80 microprocessor, 64K bytes of random-access memory (RAM), 32K bytes of read-only memory (ROM) and Digital Research, Inc.'s CP/M operating system, Epson said.

Geneva/PX-8 weighs 4 lb, has an 8-line by 80-col. display and is bundled with word processing, spreadsheet and scheduler software from Micropro International Corp.

A number of peripheral devices for the Geneva were on display. These included a 3½-in. disk drive with 320K bytes of storage ($599); an 80-col., 9-pin head thermal printer ($250); and a direct-connect modem ($180). Three expansion units were also offered: 64K bytes of RAM, coupled with a direct-connect modem ($360); 60K bytes RAM ($329); and 120K bytes RAM ($460).

Epson America can be reached at 3415 Kawisha St., Torrance, Calif. 90505.

Teleram Communications Corp. has added an 8-lb lap computer that runs under Microsoft Corp.'s MS-DOS operating system to its lap computer line.

Teleram's Dulcan Magnum features either an 8- or 16-line by 80-char. display. Dulcan Magnum comes with 128K bytes of ROM, 256K bytes of RAM, an Intel Corp. 80186 microprocessor, two RS-232 serial ports and a Centronics Data Computer Corp. parallel port, Teleram said. The 8-line model sells for $2,500; the 16-line Magnum costs $3,000.

Teleram is located at 2 Corporate Park Drive, White Plains, N.Y. 10604.

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LINKS from page 59

being very cheap.

More intelligent programs add a wide variety of services to simple communications. These packages often provide file transfer capability, which is a very important function; full control of the hardware; the ability to access the operating system of the micro and its software; and other features.

Examples of such programs are Ascom from Dynamic Microprocessor Associates, Inc.; Crosstalk from Microstuff, Inc.; Vterm from Saturn Consulting Group; and Teleterm from Telexpress, Inc. Some of these are available for a wide variety of Zilog, Inc. Z80 and Intel Corp. 8088 systems.

For these more intelligent programs, the advantage of terminal emulation capabilities is that a variety of software and hardware requires that emulation.

For example, a multivendor data processing shop with both IBM-compatible mainframes and DEC VAX-11/780 superminicomputers might standardize on a VT100-compatible terminal and terminal emulator. A VT100-type terminal can access the IBM-compatible mainframes as well as the VAX superminis, giving users full screen editing and other capabilities on either type of system.

Of the four products mentioned above, three emulate the VT100 — Crosstalk, Vterm and Teleterm. Crosstalk is available in both Digital Research, Inc. CP/M-80 and Microsoft Corp. MS-DOS versions. Although only the MS-DOS version operates well above 1,200 bit/sec. Vterm is a dedicated VT100 emulator for MS-DOS systems and works well up to 19.2K bit/sec. Teleterm is designed only for Radio Shack systems: TRS-80 Models 2, 12 and 16 operating under TRS-DOS and the Radio Shack Model 2000 operating under MS-DOS.

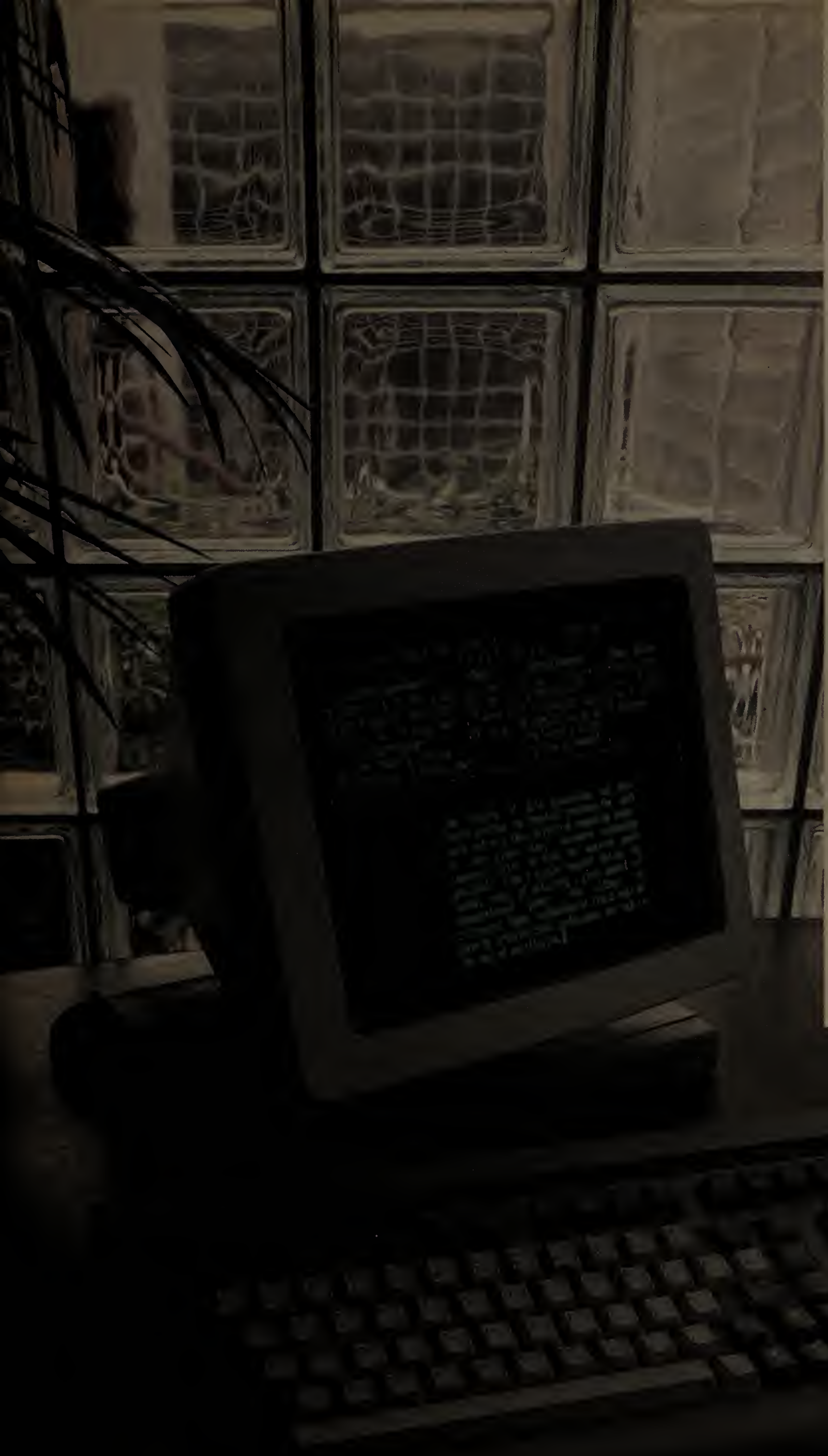
All four products have file transfer facilities that work with varying degrees of success, but none operates stand-alone in a mainframe data base context. These products clearly meet some needs — but not all.

TOOLS from page 59

cations through Digital Equipment Corp. VT100, VT52 and teletypewriter terminal emulation. In addition, the package gives access to on-line information services, Apple said.

Macterminal, priced at $99, runs on either the Macintosh or on Lisas running Macworks (the Macintosh operating system for Lisa).

Apple Computer is located at 20525 Mariani Ave., Cupertino, Calif. 95014.



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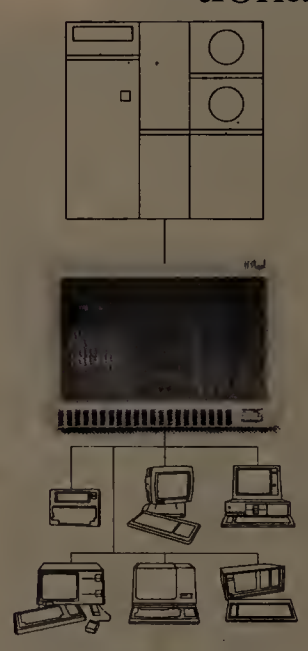

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COMPUTER INDUSTRY

HP in corporate reshuffle, appoints operations chief

By David Olmos
CW Staff

PALO ALTO, Calif. — Hewlett-Packard Co. last week announced a comprehensive corporate reorganization, including the promotion of Dean O. Morton, formerly an executive vice-president, to the newly created position of chief operating officer.

John A. Young will remain as president and chief executive officer at HP. Company cofounders David Packard, chairman of the board, and Bill Hewlett, vice-chairman of the board, will retain their present titles.

"By adopting a structure that closely reflects our major markets, we are making it easier to focus the full breadth of our measurement and computation capabilities on the needs of our customers," Young said in a statement last Monday.

HP, which built its reputation selling instruments to the scientific market, recently has been making a move into the personal computer area.

With the new organization, HP is changing from a product-based structure to a more market-based one. The realignment consists of four major sectors, one of which will be responsible exclusively for marketing and selling. The sectors include:

■ Measurement, design and manufacturing systems, including electronic instruments, microwave and communications products, manufacturing systems and computer-aided design and engineering. The group will be headed by William E. Terry, an executive vice-president.

■ Information systems and networks, including the business and personal com-

See HP page 72

Sperry to write down $30.3 million on Trilogy wafer-scale investment

NEW YORK — Sperry Corp. said its first-quarter results will include a write-down of $30.3 million of its $40 million investment in Trilogy Ltd.

The move will produce an after-tax charge of $21.8 million, or 40 cents a share, against Sperry's earnings for the quarter ended June 30, the company said.

Last month, Trilogy, of Cupertino, Calif., announced it was discontinuing plans to develop a large-scale, IBM-compatible computer based on wafer-scale integrated circuits. The company said it would continue to work on alternative uses for the wafer-scale technology under development, including its use in smaller computer systems [CW, June 18].

Access to chip technology

Sperry was the largest of three companies that invested about $77 million in Trilogy stock. Sperry purchased 5 million shares, or 15%, of Trilogy as part of an arrangement to gain access to Trilogy's chip technology for future Sperry computer systems.

Digital Equipment Corp., which invested $26 million, owns 9% of Trilogy's common stock. France's CII-Honeywell-Bull, which made a $13 million investment, owns a 7% share.

Sperry said the charge will reduce anticipated first-quarter earnings to a level below that of the first quarter of 1983, in which the company reported income from continuing operations of $21.6 million, or 46 cents a share, on revenue of $1.22 billion.

'Sharply higher' earnings

Without the charge, Sperry said, its first-quarter earnings would have been "sharply higher." The company said it

See SPERRY page 69

INDUSTRY INSIGHT
Peter Bartolik
CW Senior Editor

Motorola 68000 still gaining users

At least one company is in no hurry to switch over to Motorola, Inc.'s recently announced Model 68020 microprocessor, one of the few true 32-bit chips commercially available.

Charles River Data Systems, Inc. recently unveiled its Universe 2203, a 32-bit microcomputer, and its unbundled central processor, the VCP2000, both designed mainly for OEMs and sophisticated end users.

Both products use the older Motorola 68000, termed a 32-bit microprocessor, but, in reality, one of those 16/32-bit chips that processes data in 32-bit chunks while moving the data in and out in 16-bit slices. Charles River Data Systems essentially emulates true 32-bit performance through a combination of cache memory and a 32-bit VME bus.

Why bring out a new product based on the older chip when Motorola just two weeks ago introduced the new chip?

According to Daniel DeLea, vice-president of marketing, the time is not yet right to hop on the new chip, and it can always be incorporated at a later date.

"The flow and pricing have got to be right," DeLea said. Right now, Motorola is saying the new chip will be priced at around $487 per unit in quantity.

Jim Isaak, director of product marketing with Charles River Data, said it will probably take about 6 months for Motorola to work out mass production bugs and start delivering the 68020 in quantity with quality.

Still, when that mass production is up and running, the Motorola chip looks to provide the chip maker with a powerful follow-on product to the seemingly ever-

See 68000 page 69

AT&T

AT&T has frozen the salaries of its management employees through 1985, a move it said will save $184 million/**72**

apple computer

Apple Computer, Inc. said it plans to double production of its Macintosh computer by 1985/**74**

■ Israel's Elbit Computers Ltd. announced plans to market its IBM-compatible 4300 processor in the U.S./**74**

Hercules should have worked so hard — NCC exhibit booth crews

By John Gallant
CW Staff

LAS VEGAS — Try to imagine constructing an entire modern city, complete with lighting, telephones and sophisticated structures, in less than one week.

That, according to Edward Van Holland, will give you an inkling of how much work and how many headaches were involved in setting up the trade booths that so many visitors to the National Computer Conference here simply took for granted as they wandered the exhibit floor.

As manager of exhibits and trade shows for Waltham, Mass.-based Honeywell, Inc., Van Holland had the unenviable responsibility of coordinating the setup of the company's 40- by 50-ft double-deck booth. Designed in 1982, the carpeted and fully furnished exhibit has just made its 10th appearance at a major trade show. Each conference, Van Holland said, takes its toll on the $125,000 booth, which at an average of six shows a year, was expected to survive about four years with one major, and very expensive, refurbishment.

According to Van Holland, Honeywell spent nearly $60,000 to have the exhibit shipped to Las Vegas and assembled from the concrete floor up. The 271 major sections that comprise the superstructure of the booth were delivered by van one week prior to the opening of NCC and took some 140 man-hours of work to piece together. Six teamsters unloaded the custom-designed shipping crates from the trucks, and a team of carpenters and stagehands, most members of local unions, assembled the booth.

In addition, the project involved four electricians, three telephone technicians and two florists, who arranged the variety of potted plants that decorated the exhibit. The work crew was directed by a "lead" man from I & D, Inc. in Atlanta, the exhibition contractor that works hand-in-hand with Honeywell's Trade Show Group. Once assembled, the booth is manned by a staff of 35 attendants working split shifts throughout the day.

"Our biggest problem is getting the exhibit off the trucks and over to the booth space in good shape. The crates are not handled very gently by the workers. The key is to get good people to coordinate the project. You simply cannot do it all in-house. You need someone to work with the unions and all the other people involved from start to finish," Van Holland said.

For this year's NCC, CIE Terminals, Inc. had less than three days in which to assemble its 50-piece, two-story, grey and maroon motif exhibit. The exhibition floor was built up from the center out and because CIE's booth was located near a freight door, the firm was one of the last to begin construction. Because of that, according to Esther Lisenby, marketing communications specialist for the Irvine, Calif., company, much of the 30-hour assembly task was handled by crews working on overtime pay scale. As a result, the set-up costs — about $30,000 — were almost twice normal costs.

Lisenby said the assembly process involved a five-man crew using a forklift to set the exhibit's modular sections into place. The CIE booth, which was used for NCC and the two Comdex shows, is expected to last only about two years, after which it will be completely redesigned to modernize its appearance. The exhibit refurbishment usually coincides with the introduction of a new product line, she said.

Lisenby recounted a "horror story" that CIE experienced at Comdex/Fall here in 1982. "We had

See BOOTHS page 73

Consco goes public, sees transition as necessary to expansion

By Peter Bartolik
CW Staff

FRAMINGHAM, Mass. — After going public, dealing with an accounting change that converted profits into losses and accomplishing a fourfold increase in personnel, Consco Enterprises, Inc. readily admits it has been through a transition.

In fact, the New York-based software development firm trumpets its "Year of Transition" as a much-needed turn of events leading toward expansion.

Two years ago, Consco was a 20-person operation that over the previous decade had built a $1-million business based mainly on limited sales of its Consolidation System package designed to consolidate and report the financial statements of corporate entities according to generally accepted accounting principles.

It was also gearing up for sales of a newer product, the Accounting Information System (AIS), an outgrowth of its general ledger system, but designed around relational data base concepts to enable users to manipulate a broad range of financial data according to desired purposes.

At the end of fiscal year 1983, the company had grown to 80 people, raised more than $4 million through the sale of a limited amount of stock and had added a number of new customers. While Consco presently has only about 70 customers using either or both products, it has greatly expanded its sales and service capabilities and intends soon to introduce a scaled-down version of AIS for smaller customers.

In a recent interview here, the company's top executives readily admitted that the road to growth was not without its bumps. During its first year as a publicly held company, a paper loss of $1.2 million was recorded; accounting methods were changed from capitalizing research and enhancement costs against future revenues to the increasingly common method of expensing those costs in the quarter incurred against present revenues. Such a change brings a painful one-time hit against present revenues as costs previously staggered across several future financial periods are instead taken in one period. Revenues for the year

Intel reports profits up

SANTA CLARA, Calif. — Intel Corp. recently reported second-quarter profits of $55 million, or 47 cents per share, up from $24 million, or 22 cents per share, reported for the comparable quarter a year earlier.

Profits and revenues for the quarter were both at record levels, the company said. Revenues for the second quarter, ended June 30, were $410 million, 58% ahead of the $260 million reported a year earlier.

Gordon E. Moore, chairman and chief executive officer, said sales of microprocessor products are "proceeding well."

He added, "We are also hard at work to expand our production capacity worldwide, to enable us to accommodate present demand and provide for production of complex new products currently in development."

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were $2.8 million.

According to Consco founder Seymour Altucher, also the company's president and chief executive officer, "Less sophisticated people [holding public stock] just saw the reduction [in profits]. We probably didn't cushion it as well as we could have." With that shock and the general decline in high-technology stocks, Consco's shares have declined — during an overall retrenchment in high-tech stocks — from the initial offering price of $7 per share to a present trading level around $2 per share.

Hired quickly

Additionally, according to Altucher, "we did hire a little quickly," and recently some pruning was required to ensure that the personnel in the company were the best to meet its goals.

Despite the time-consuming process of going public and the few bumps, Altucher said the process enabled the company "to achieve a level of funding we would not have been able to otherwise, and we are able to move forward at greater speed."

Donald Goodman, Consco's executive vice-president, said the results will be seen this year in greater advertising efforts, a beefed-up sales force and a larger service force to meet the demands of a greater number of customers. "To get the marketing, advertising and support is not something a 20-man company could do," Goodman said. The company stressed its commitment to on-site training, support and service.

The immediate plan for 1984, according to Goodman, is "to get out there and let the world know what we have." The company's accounts are limited presently, but they include Amdahl Corp., Ford Motor Co., GTE Products Corp., Diamond Shamrock Exploration Co., Smithkline Corp., Owens-Illinois International, Westinghouse Electric Corp. and other Fortune 500 clients.

Goodman recalled winning the Firestone Tire and Rubber Co. as a client. "Firestone was two days away from giving the contract to someone else when we contacted them. They asked, 'How come we didn't hear from you before?' " The publicly funded growth is designed to ensure more such clients are aware of the company before they sign with other companies, he added.

SPERRY from page 67

continues to expect fiscal 1985 earnings to be "significantly better" than a year ago. Sperry reported earnings of $200 million, or $4.17 a share, in fiscal 1984.

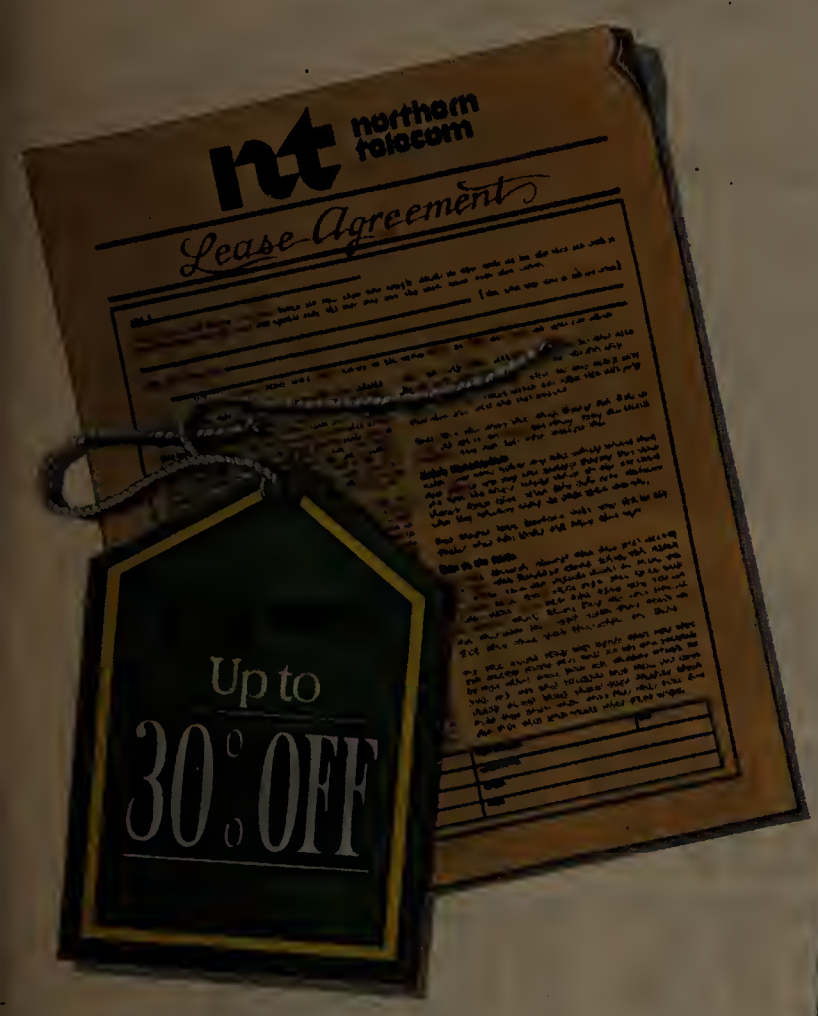
Sperry said it "continues to believe that wafer-scale integration technology and Trilogy's contribution to its development will be important in the longer term."

Trilogy said its wafer-scale chip will be fully operational in the first quarter of 1985, about 15 months later than originally planned.

68000 from page 67

increasing success of the 68000. It is claimed the new chip will execute between 2 million instructions per second (Mips) and 3 Mips, one heck of a boost for use in both desktop systems and as components of even higher end systems. Not only that, but Motorola has made a determined effort to ensure that the 68020 is fully compatible with the 68000.

While Intel Corp. has gained most of the glory, based on its association with IBM's Personal Computer, the Motorola 68000 has quietly built up an impressive list of clients, ranging from fault-tolerant computers to a high-end IBM microcomputer. And with its incorporation in the Apple Computer, Inc. Macintosh, the 68000 may yet see a level of demand that could stand next to the Intel products.



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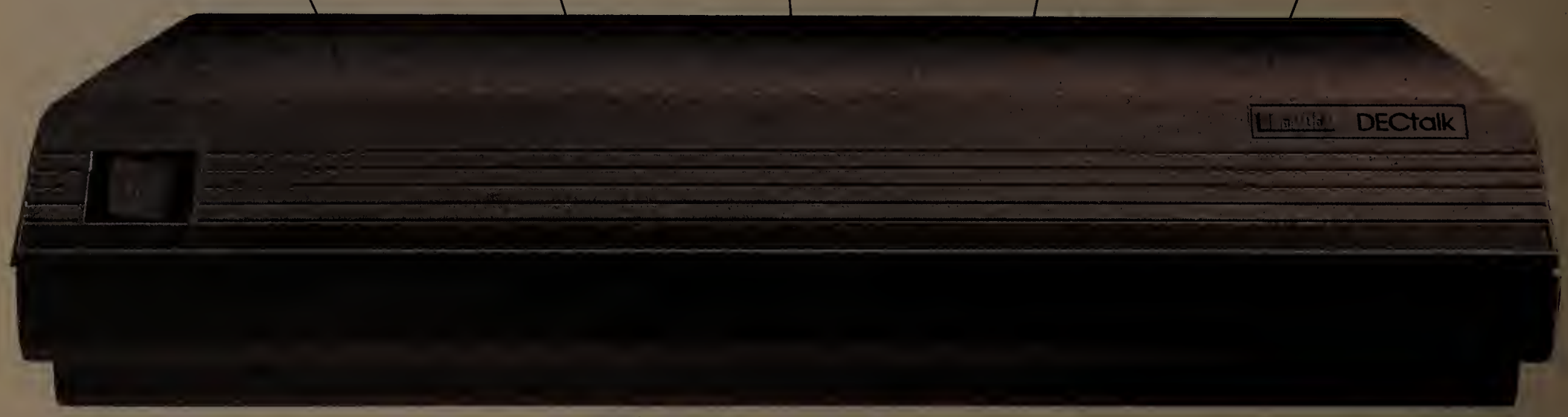

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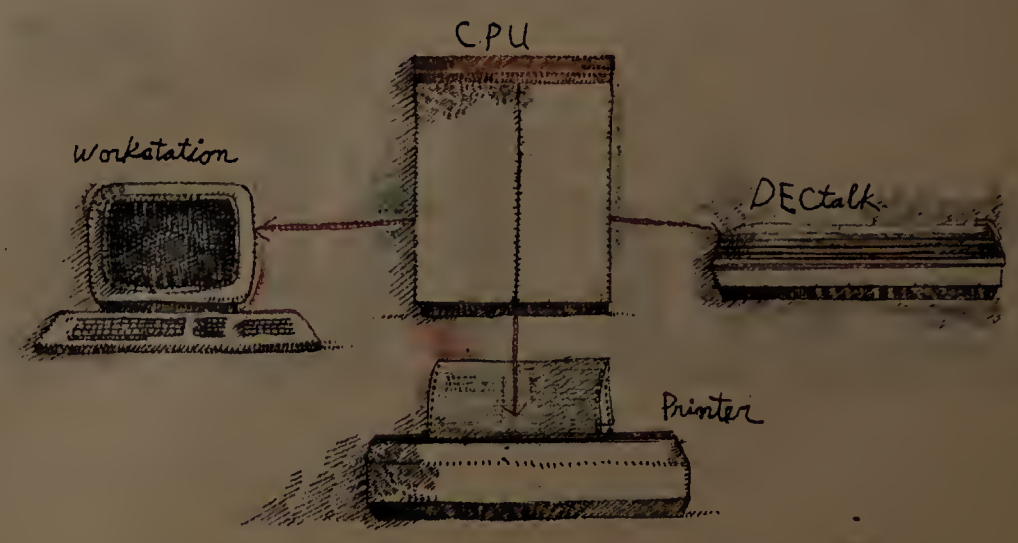
Instead of using pre-recorded words and phrases, the DECtalk system performs true speech synthesis in a unique, three-step process. First, it converts each word into digitized phonetic symbols. Then it adds inflection, denoting punctuation and the relative position of words within a sentence. Finally, it generates realistic speech output through the synthesizer unit.

Instead of a flat, undifferentiated monotone, DECtalk gives you a variety of easily-understandable, natural-



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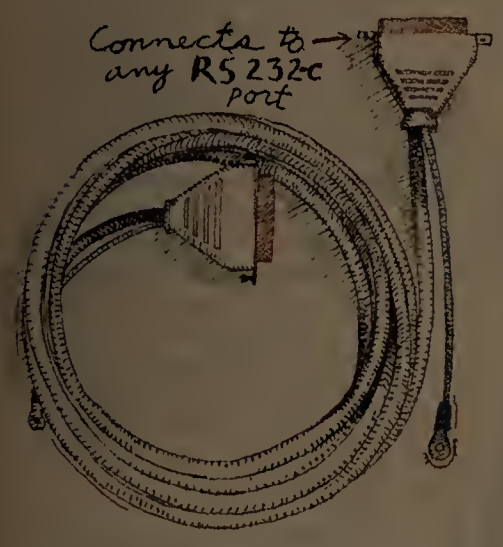
sounding voices, with modulated pitch, clear inflection, varying tones and selectable rates from 120 to 300 words per minute. You can choose from eight different speaking personalities, including male, female and children's voices. This lets you add emphasis to your message—using one voice for system prompts, for example, and another voice speaking at a faster rate to convey database information.

You don't have to restrict your vocabulary when you work with the DECtalk terminal, either. The system determines proper pronunciation by referring to its own internal dictionary and a set of letter-to-sound rules which can be applied to almost any word. You can add a special dictionary of your own for terms that are unique to your environment. As a result, the DECtalk vocabulary is extremely comprehensive.

Even that's not all, because we've engineered the DECtalk system with the ability to recognize words in context. For example, consider the difference between $1.75 and $1.75 million. Primitive systems would read



this as "dollars-one-period-seven-five" and "dollars-one-period-seven-five million."The DECtalk system considers the context, and interprets these figures correctly as "one dollar and seventy-five cents," and "one-point-seven-five-million dollars." It also handles abbreviations properly. It will output "St. James St." correctly as "Saint James Street." In other words, you can hear it the way you would read it. No speech synthesis system has ever achieved this level of quality at such a low cost.

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Any computer or word processor that generates ASCII alphanumeric text and uses an RS232-C port can use the DECtalk terminal. This includes every system Digital makes, as well as the vast majority of computers marketed today—from personal computers to mainframes.

Just as important as the fact that the DECtalk terminal works with almost any computer is the way it works with them: transparently. The DECtalk system is as easy to install as any printer or video terminal, because, to your computer, the DECtalk unit is just another serial output device. All the text-to-speech intelligence is embedded within the compact, briefcase-sized unit itself.

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The DECtalk system allows you to use any standard Touch-Tone™ telephone as a computer terminal. It can provide speech output over standard telephone lines, and will respond to commands issued through Touch-Tone telephone keypads. The DECtalk system incorporates auto-dial capabilities, too, so your computer can use the DECtalk terminal to send spoken messages to users over telephone lines automatically.

In addition, the DECtalk unit has its own internal speaker, so it can stand alone or operate in conjunction with a workstation and keyboard. It can also use an external speaker or public address system. These speech output capabilities open up an incredible variety of applications.

As an adjunct to an electronic message system, for example, the DECtalk terminal can allow travelling managers and professionals to access their mail remotely from any Touch-Tone phone.

Salespeople can call up DECtalk services while in a client's office to determine order status, check a price listing, or note inventory balances.

Banks can use DECtalk systems to let customers call up their own account balances, without requiring assistance from clerical staff.

In a process control environment, a DECtalk terminal can add spoken status messages to the information portrayed in graphic displays and screen prompts. And that can make it a lot easier for operators to effectively monitor and respond to critical events.

The DECtalk terminal is a boon for the handicapped, too. It can give a vision-impaired person an effective, economical way to work with computers. And it can give a speech-impaired person a way to verbalize his or her thoughts in person or over the phone.

This just begins to suggest the applications for the DECtalk speech synthesis terminal. Its usefulness is limited only by your imagination.

THE PRICE IS EQUALLY AMAZING.

When you consider everything Digital's DECtalk system does—the way it provides database access through telephones instead of terminals, the unique quality of its voice output, its ease of installation, its compact, briefcase size, its compatibility with almost any computer, and the fact that there's no overhead because all the text-to-speech intelligence is contained within the DECtalk unit itself—the price may be the most amazing feature of all. The DECtalk system is available now for $4000* or less, depending on quantity.

In short, the DECtalk system makes computerized speech output both practical and affordable. And that makes the DECtalk speech synthesis computer terminal the best engineered computer interface you can buy for literally thousands of applications.

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AT&T freezes management salaries through 1985

NEW YORK — AT&T recently announced it had implemented a salary freeze for management-level employees through 1985. The move is expected to save the company nearly $184 million in expenses in 1985, a spokesman said.

The freeze will be applied to all management positions, first-level through chairman, the company said. However, employees may receive "progression increases" within their present grades if they are being paid below the "entry, standard or top rate" within those grades. Also not affected are commissions and incentive compensation or bonus plans.

AT&T Chairman Charles A. Brown called the freeze "a necessary element in our comprehensive effort to reduce costs in every aspect of our operations."

In a statement distributed to management employees in a series of meetings worldwide, Brown said that the move was part of "a new realism" impacting the organization.

"That realism dictates that we must accelerate the shaping of the new AT&T from an enterprise that conducted a single business — telephone service under regulation nationwide — to one that conducts many lines of business in high-technology products and services worldwide in markets that are fiercely competitive," the AT&T chairman said.

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HP from page 67

puter divisions and computer peripherals and networks group. John L. Doyle, who has been appointed an executive vice-president, will head this sector.

■ Medical and analytical instruments group, which will include Hewlett-Packard Laboratories, the company's central research and development unit, as well as the corporate manufacturing and corporate engineering functions. Executive Vice-President Paul C. Ely Jr. will direct this group.

■ Marketing and international, which encompasses worldwide sales and sales administration activities for measurement and computation products, major accounts marketing and other corporate marketing activities. This sector also will oversee all manufacturing operations outside the U.S. Heading this sector will be Richard C. Alberding, a newly appointed executive vice-president.

A fifth group, responsible for corporate finance and administration, has not been changed, according to HP. The group will continue to be led by Robert L. Boniface, executive vice-president.

Need to tie sectors

According to Young, the creation of the chief operating officer position results from "the need to draw together and give more active management to the major sectors of our business."

Morton is a graduate of the Harvard Business School and has worked at HP for 24 years. He has been an executive vice-president and member of the company's board of directors for seven years.

Since 1977, he has headed the company's medical products, analytical instrumentation and components groups. HP's executive vice-presidents will report to Morton, and Morton will now report to Young, according to the company.

Spreading responsibility

"As a long-time HP officer and current chairman of the HP management council, Dean Morton is well qualified to take on some of these responsibilities, while I devote more attention to the broader, longer range issues facing our company and industry," Young said in a statement.

According to HP, the reorganization represents the fourth major restructuring since 1970.

Previous changes included the creation of product groups in 1970, the alignment of the marketing force by product group in 1975 and the realignment of the former computer divisions organization along product and market dimensions, which took place last year.

COMPUTER INDUSTRY

The psychology behind show booths

By John Gallant
CW Staff

LAS VEGAS — At a trade show such as the National Computer Conference, it is not just the products that compete for your attention.

"Having an attractive exhibit is not just an advantage for a vendor, it is a necessity," said Charles Conte, director of communications for Honeywell, Inc.'s Information Systems Division. "We are not only competing against each other's equipment, we are competing against each other's exhibits to attract more traffic and to appear more inviting."

According to Conte, a good deal of crowd psychology goes into the design of the booths that line the exhibition floor of a major conference. He said Honeywell's exhibit was intended to convey an "open-air" atmosphere because the company believes people are basically reluctant to step into a booth area.

"Visitors are tenuous about committing their time to a vendor at a show. They like to stand on the periphery, and they are very leery about going through doors and tunnels or into enclosed areas. The booth designers, who are well educated in traffic flow, try to give the exhibit an open feeling, rather than an ominous or imposing one," Conte said.

Ellen Williams, marketing communications manager for CIE Terminals, Inc., echoed Conte's view.

"We compete to outdo each other. When you reconfigure your booth for shock effect to entice people, you have to give them something taller or brighter. You want visitors to leave saying 'Wow!' You want them to tell their friends that they just have to see that booth."

But Robert Cowan, vice-president of C. Itoh Electronics, Inc., disagreed. "In this business, I do not think flashiness is all that important. We are selling to large buyers and sophisticated people. It is not as though we were selling soap or candy. The booth should make you look substantial, trustworthy — like a class organization."

BOOTHS from page 67

a much smaller booth at that time and it was located adjacent to one of the freight doors. One day it rained like crazy and the rain leaked under the door, warping the exhibit and shorting out all the electrical wiring. It was a real nightmare."

Robert Cowan, vice-president of C. Itoh Electronics, Inc., said the Los Angeles-based company has been fortunate not to have experienced any problems in the many years it has exhibited at conferences such as NCC. The firm spent some $50,000 to ship and assemble its $250,000 wood-paneled exhibit, which sported a spiral stairway leading to three plush conference rooms. As with CIE, C. Itoh's booth is used solely for NCC and Comdex. Its approximately 80 modular sections, which can be reconfigured to form smaller exhibits, took three people more than a day to assemble. Another day and a half, Cowan said, was spent on cosmetic finishing touches.

Of the circular, modernistic exhibit, Cowan said, "The whole thing requires an exhausting amount of maintenance."

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SCIENCE/SCOPE

Artificial intelligence is the focus of a new advanced technology center at Hughes Aircraft Company. The facility brings research and development efforts under one roof. Scientists and engineers will work closely with universities throughout the country to develop software and equipment to build the so-called expert systems. Studies will center on knowledge representation, symbolic reasoning and inference, natural language processing, and knowledge acquisition and learning. Technology will be developed for image understanding for missile targeting and geological surveys from space, smart avionics to reduce pilot workload, self-controlled systems, simulation and training, fault diagnosis and maintenance, and manufacturing resource allocation and planning.

Improvements to a "super cooler" used with infrared sensors in space will extend the life and boost the efficiency of the device. The cooler, vital to defense applications and geological surveys, is a Vuilleumier cycle cryogenic refrigerator. It is designed to chill sensors near absolute zero to increase their sensitivity to thermal radiation. These coolers are ideal for use in space because the low internal forces required by this kind of cooling cycle cause little wear on bearings and seals. Hughes is working under a U.S. Air Force contract to extend the unattended operating life of the cooler beyond five years. The cooler will use less power, so smaller and fewer batteries are needed to power the device during eclipse periods—a savings of hundreds of pounds.

A new type of field-effect transistor has been used to produce ultra high-speed integrated circuits. The device, called the high electron mobility transistor, employs a heterostructure to transfer electron charge from a heavily doped aluminum gallium arsenide layer into an adjacent high-mobility ultrapure gallium arsenide layer. It promises improved performance at low temperatures. Hughes research scientists foresee such applications as digital frequency division and synthesis, high-speed signal multiplexing, memory and analog/digital conversion, and microwave low-noise amplification.

Development times for semicustom very large-scale integrated (VLSI) circuits have been cut from greater than one year to 20 weeks at an ultramodern computer-aided training and design center at the Hughes facility in Newport Beach, California. Utilizing advanced design automation software, a comprehensive library of predesigned logic functions (called Macros), and preprocessed wafers, the new facility is helping engineers design chips with 2,000 to 8,000 gates and with as many as 180 pins. New 3-micron dual-layer metal HCMOS processes are applied to both standard cell products and state-of-the-art gate arrays. Skilled design engineers and education specialists at the Newport Design Center provide training and technical support for IC designers throughout the company.

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Apple to double Macintosh production to meet demand

By Eric Bender
CW Staff

LAS VEGAS — Seeing high demand for its Macintosh personal computer, Apple Computer, Inc. plans to double Macintosh production capability by 1985, Chairman Steven Jobs said here at a press conference July 9.

Apple is approaching the 40,000 per month capacity the company predicted in January, Jobs said. "We are installing almost double that [capacity], which will be on-line by the end of the year," he said.

Apple posted sales exceeding $400 million during its recently concluded third quarter, President John Sculley said. "When the rest of the computer industry was in a slump, we were up 33% over our second quarter."

Strong sales

Sculley claimed that sales were strong across the company's entire product line, including the Lisa personal computer, "a product we had a tough time selling to anyone as recently as seven or eight months ago."

Apple's recent exhibit at the National Computer Conference here was designed primarily to showcase software applications now becoming available for the Macintosh, Jobs said.

The company expects more than 70 packages to be offered within 90 days, Jobs said. "By year-end, we expect over 150," he added. The number "will avalanche" in 1985, with more than 2,000 programs offered by year-end.

"It took IBM a year-and-a-half to get where we are in six months," Jobs said.

Many packages "are not just simple ports from the [IBM Personal Computer], but innovative software written specifically for the [Macintosh]," Jobs maintained. As one example, he mentioned Filevision, a "visual data base" from Telos Software Products in Santa Monica, Calif. "You can create your own images, you can create a data base and link them together," Jobs said.

As software becomes available, "we are starting to get important interest from large corporations, even though [that] was not one of our key strategies for 1984," Sculley said.

Although company officials declined to mention any specific deals, Jobs said Apple is signing contracts with two or three large corporations each month. "We will have sold to 10% of the Fortune 500 by year-end and one-third of the Fortune 500 by the end of 1985," he predicted.

"The first wave of Fortune 500-type accounts will be those who are very much like Apple," said Michael Murray, marketing manager for the Macintosh division. "They're risk-takers. They're not dinosaurs in whatever industry they're in."

Elbit to enter U.S. mart with IBM-compatible processor

By John Desmond
CW Staff

LAS VEGAS — Elbit Computers Ltd. of Haifa, Israel, announced plans at the 1984 National Computer Conference recently to launch U.S. sales of its IBM-compatible 4300 processor, which the company said has an installed base of nearly 1,000 units, mostly in Europe.

The 32-bit Elbit 6341 low-end mainframe computer series is said to be fully compatible with IBM 360, 370 and 4300 CPUs, enabling most IBM operating systems to run on the machine.

Asked why Elbit was choosing to compete with IBM with a hardware product similar to ones that several U.S. companies have tried unsuccessfully to market, Elbit Marketing Manager Elli Miasnik said, "We believe there is a market we can fill. Our advantage is a set of fully integrated controllers emulating regular IBM devices."

He added that he expects the 6341 to be cost-effective for OEMs.

According to Miasnik, the company has not yet made "a full commitment to a full support organization for the product" in the U.S. He said the company would make that commitment when the value-added remarketer market opens up in this country.

Peter L. Vosotas, president of Nicholas International, a high-technology export training company that is representing Elbit in the U.S., said, "We think there will be a very big window for [value-added resellers] that don't want to do business with IBM."

The price for a 6341 with .5 million instructions per second, 3 channels, 2M bytes of memory and a fixed console will be approximately $50,000, depending on extras, Vosotas said. He said the product could be delivered in the U.S. 30 days after receipt of order.

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SUPERSHORTS

Zax Corp. announced it is entering into a long-term engineering and marketing arrangement with **Microtec Research, Inc.** Under the terms of the agreement, Microtec Research will develop a communications and symbolic debug package for the Zax in-circuit emulators that will run on all Microtec software products, including their Pascal and C compilers. Zax will immediately start marketing all of Microtec's software packages through the Zax sales network of manufacturers representatives and worldwide distributors.

■

Digital Sound Corp. (DSC) has signed a licensing agreement with **Northern Telecom, Inc.** that allows DSC to develop an interface between its new voice processing subsystem, the DSC-2000 Voiceserver, and Northern Telecom's SL-1 family of digital business communications systems.

■

A. O. Smith Data Systems announced that it has signed an agreement with **SPL International** to market its EFT software programs in the UK and Western Europe, using hardware designed by **Tandem Computers, Inc.** A. O. Smith Data Systems is a division of A. O. Smith Corp. SPL International is a distributor of computer hardware and software overseas, with headquarters in London and offices in Sweden, Holland, Belgium and Luxembourg.

■

Greyhound Computer Corp. announced that the company's name has been changed to **Greyhound Capital Corp.** According to Olie Swanky, president and chief executive officer, the name change reflects the extensive diversification and expansion of the company's activities in recent years. Originally founded as a computer lessor, the company now is a broadly based financial services entity.

■

Laser Memory Systems is in the process of being dissolved, according to Raymond Brooke, founder and chief executive. "The primary reason is that, although the technology has been developed for optical recording on a hard disk, we have determined that it will be some time before reliable media are available," Brooke said. Brooke also stated that too much time would be required before acceptable media are available to justify any further investment.

■

Digital Equipment Corp. and **CSP, Inc.** have signed a cooperative marketing agreement concerning CSP's map array processor and DEC's VAX-11 and PDP-11 computers for computationally demanding applications. The two companies will work cooperatively in marketing, promotion, sales and applications support efforts.

■

Ztel, Inc. announced the opening of its eastern regional office in New York and began opening a planned network of eastern field offices by establishing New York and Boston branch offices. Ztel's eastern region will be responsible for a 13-state area that includes all of New England, the District of Columbia, New York, Pennsylvania, Delaware, Maryland, West Virginia, New Jersey and Virginia.

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Lease vs. buy: Careful evaluation of alternatives

By Roderic L. Eaton
Special to CW‡

Of the estimated $61 billion invested by American business in plants and equipment in 1983, leasing financed the largest share — more than bonds, stocks or mortgages. Today, eight out of 10 companies in the country use leasing, including most of the Fortune 500 firms.

One of the uses often cited for leasing today is as a hedge against equipment obsolescence. This has been especially true in the computer and peripherals markets. Given the speed with which technology is changing, it has become increasingly difficult to always have available state-of-the-art equipment at a reasonable cost.

In leasing, the lessee, or user of the equipment, defines the lease term which purposely can be set no longer than the user's perception of the technological life of the equipment. He is free to walk away from the equipment at the end of the lease term, upgrade the existing equipment or lease new equipment.

There are many reasons to lease rather than purchase. Depending on the structure of the transaction, leasing can provide 100% financing, result in off-balance sheet accounting treatment, overcome a variety of corporate budgeting constraints and provide overall convenience and flexibility not found in alternative means of financing.

Frequently, the overriding factor in deciding on the proper financing alternative is cost. How does one ensure that the lowest cost alternative has been selected?

Most sophisticated companies today use a discounted cash flow or present-value technique to evaluate quantitatively the lease vs. buy decision. Present-value analysis is a problem-solving technique that enables the comparison of unlike investment returns by discounting each cash flow back to its present-day value. As a practical reality, lease vs. buy involves three alternatives: purchase with cash, purchase with borrowed funds or lease. The methodology, if properly understood and consistently applied, will lead to the lowest cost alternative.

Let us assume that a company requires the use of a computer system to serve the needs of one of its divisions for an estimated five years. The system has a cost of $250,000. Rather than pay all cash up front, the company is alternatively considering borrowing 80% of the purchase price for five years at 2% over prime rate (14½%) or leasing the equipment for five years at a rental of $5,000/mo.

All installation, operating and maintenance costs are identical for each option. The lessee projects a marginal tax rate of 46% over the five-year term and has a return-on-equity objective of 15%. This later rate will be used as the rate for discounting, to the present, the future cash flows for each alternative. In this analysis, the lowest cost alternative is the most desirable and, therefore, will be selected.

Year	Annual Payments	ACRS Depreciation	Investment Tax Credit	FIT (46%)	Net Cash Flow Out (In)	Discounted Cash Flow @ 15%
0	$250,000		$(20,000)		$230,000	$230,000
1		$37,500		$(17,250)	(17,250)	(15,000)
2		55,000		(25,300)	(25,300)	(19,130)
3		52,500		(24,150)	(24,150)	(15,879)
4		52,500		(24,150)	(24,150)	(13,808)
5		52,500		(24,150)	(24,150)	(12,007)
					Present Value:	$154,176

Figure 1. The Purchase

The purchase-with-cash scenario is outlined in Figure 1. Five-year ac-

MAI finds buyer for Basic Four

NEW YORK — Management Assistance, Inc. (MAI) recently revealed it has signed an agreement in principal to sell its worldwide Basic Four Information Systems operations to Bennett LeBow, a private investor, for $30 million in cash and an additional $75 million in debt and stock.

Subject to final approval, LeBow will assume the operating obligations of the Basic Four Division and certain other liabilities. MAI said LeBow had emphasized that he plans to continue the current U.S. and international organization and to expand Basic Four operations worldwide.

The proposed sale and its terms were announced by MAI in June, but the company had declined to identify the purchaser.

MAI said that talks are continuing with potential acquirers of its Sorbus Service Division, which constitutes the remainder of the firm.

assists in optimum return on equipment investment

Year	Cash Payments	ACRS Depreciation	Interest Expense	Investment Tax Credit	FIT (46%)	Net Cash Flow Out (In)	Discounted Cash Flow @ 15%
0	$50,000			$(20,000)		$30,000	$ 30,000
1	56,468	$(37,500)	$(27,099)		$(29,716)	26,752	23,263
2	56,468	(55,000)	(22,546)		(35,671)	20,797	15,726
3	56,468	(52,500)	(17,287)		(32,102)	24,366	16,021
4	56,468	(52,500)	(11,212)		(29,308)	27,160	15,529
5	56,468	(52,500)	(4,196)		(26,080)	30,388	15,108
						Present Value:	$115,647

Figure 2. Bank Loan

Year	Annual Payments	ACRS Depreciation	Investment Tax Credit	FIT (46%)	Net Cash Flow Out (In)	Discounted Cash Flow @ 15%
0						
1	$60,000	—	—	$(27,600)	$32,400	$ 28,174
2	60,000	—	—	(27,600)	32,400	24,499
3	60,000	—	—	(27,600)	32,400	21,304
4	60,000	—	—	(27,600)	32,400	18,525
5	60,000	—	—	(27,600)	32,400	16,109
					Present Value:	$108,611

Figure 3. The Lease

celerated cost-recovery system depreciation is utilized and the 8% investment tax credit election is made. It is assumed that all tax benefits can be used currently by the company if it were to purchase the equipment. Using the 15% discount rate, applied on an annual basis, a cost to purchase the system in present dollars of $154,176 is produced.

In Figure 2, a loan for 80% of the purchase price is obtained at 2% over prime. Unlike the cash purchase, the company benefits further from the interest-paid deduction on the loan. The present value of the cash flows for the bank loan, again discounted at 15% on an annual basis, amounts to $115,647 — considerably less than the $154,176 for an all-cash purchase.

The lease analysis shown in Figure 3 produces a present value of $108,611, after giving effect to the deductibility of the rental payments for tax purposes. The present-value cost of leasing compares even more favorably with the cash purchase or a purchase with proceeds from a loan excepting, of course, that the lessee does not own the equipment as would be the case if purchased.

It should be noted that this analysis is purposely oversimplistic in that it does not include all of the costs which may be encountered in either purchasing or leasing. It should be emphasized, too, that any lease vs. buy analysis depends on the validity of the assumptions built into the model.

For example, in this discussion, it is assumed that the tax recoveries will be made at the end of each year when they very likely may be required quarterly. The important consideration is that, for purposes of the analysis, they be consistently applied.

Further enhanced benefits

The examples discussed assume that the company can currently utilize the tax benefits inherent in the ownership of capital assets. However, in the event that the company cannot use all or a part of these benefits, the advantages of leasing are further enhanced. The leasing company, by retaining and using such tax benefits, can pass most of the tax savings through to the lessee in the form of reduced rental payments.

The after-tax cost of ownership increases relative to that of leasing, and leasing clearly becomes the least costly alternative.

But while cost plays the dominant role in the choice of a financing alternative, the ultimate decision to lease or buy will not be entirely based on quantitative data. Many subjective and otherwise unquantifiable factors — such as off-balance sheet accounting treatment or liquidity preference — must be considered.

They should be itemized and evaluated. Seeing both sides of this issue with clarity will place leasing vs. buying into proper perspective and lead to the proper decision.

Eaton is senior vice-president with Equitable Life Leasing Corp., a San Diego-based subsidiary of Equitable Life Assurance Society of the U.S., and a leasing company specializing in emerging and demonstrated growth markets

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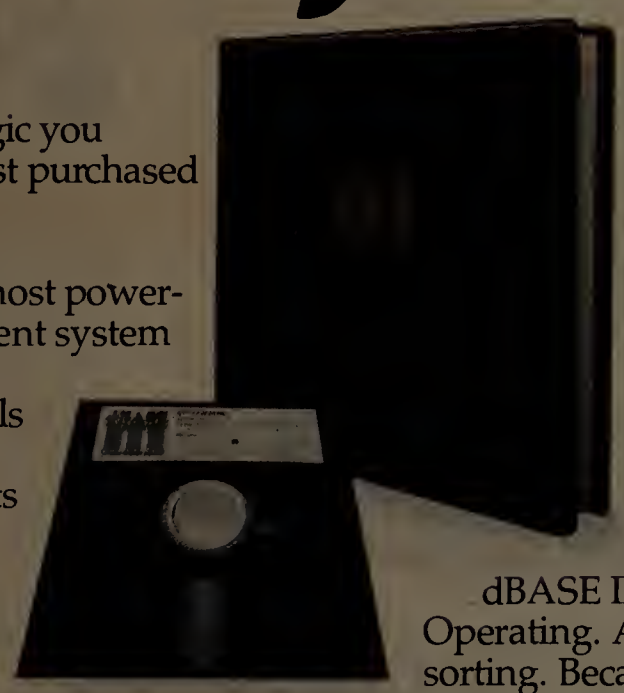

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PE to commit to product line based on AT&T's Unix

By Peter Bartolik
CW Staff

LAS VEGAS — Perkin-Elmer Corp. was at the forefront of the 32-bit superminicomputer revolution, but, in the words of James K. Sims, company vice-president and general manager of the Data Systems Group, "we haven't gathered all the rewards."

In a recent interview here during the National Computer Conference, Sims expounded on the company's current strategy of being first to sell a fully compatible product line with all equipment based on the AT&T Unix operating system. "The difference is that this time we will capture the rewards that should be ours," Sims said.

Users currently are seeking "protection of their investment," according to Sims, and that means they want equipment that is based on industry standards, he said. PE believes that means an opportunity to provide a broad array of products that all use the same software. "We will be the first in the industry to come out with full compatibility from microcomputers to superminicomputers," Sims declared.

PE thinks that other superminicomputer vendors are making a mistake by emphasizing end-user sales at the expense of their traditional customers, the value-added resellers and systems houses. "They are competing with some of their best customers," Sims said of his competition and added the traditional customers are PE's main targets.

Nevertheless, sales to the resellers, systems houses and sophisticated "in-house systems builders," plus Unix compatibility up and down the product line, are also the key strategic points that have been announced by AT&T Information Systems.

AT&T will be a key competitor, but Sims said PE has certain assets going for it that AT&T lacks. "We've been in this business a lot longer [than AT&T], and we really know what the user needs," he said. Additionally, the divested Bell operating companies "are now completely open to us; six months ago they were not," Sims said.

Sims said his company has always been primarily technology driven, rather than primarily market driven. "The companies that are going to do best in this business are those that can blend in [those technology and market considerations]," he said. But, he added, the real key will remain the ability to provide a good technological product. While PE is jumping into the Unix world, competitors will be dragged in by the demands of their customers, he said.

In addition to recent product additions, the company has "executed better than most companies have" in providing users with access to third-party vendor products, according to Sims. Also, he noted, the company spends a great deal of effort in developing training programs and films of all endorsed third-party products.

But the key strategy is the commitment to industry standards, such as Unix, the X.25 protocol, IBM's Systems Network Architecture and the Ethernet local-area network. By providing a full line of products compatible with these standards, the company hopes to make it easier for users to buy additional computing capacity without having to convert any existing resources.

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Pansophic Systems, Inc. reported revenues and profits for the fourth quarter and fiscal year ended April 30. Revenues increased to $53.1 million, up 23% from the previous year. Profits for the year increased 44% to $8.3 million, or $1.01 per share, compared with 80 cents per share reported last year. Fourth-quarter revenues were $14.9 million, compared with $11.7 million reported for the same time last year, an increase of 27%, the company said. Net income for the quarter increased by 36% to $2.1 million. Earnings per share rose 18% to 26 cents, according to the company.

■

General Automation, Inc. announced that revenues for the third quarter ended April 28 were $19 million with a net loss of $1.3 million, or 51 cents per share, compared with year-earlier revenues of $16.5 million with a net loss of $3 million, the company reported.

■

Monolithic Memories, Inc. reported sales for its third fiscal 1984 quarter were $45.9 million, approximately 74% higher than in the corresponding quarter last year. Earnings were $6.3 million, or 34 cents per share, compared with $3.3 million, or 20 cents per share in the third quarter a year earlier, according to Monolithic.

■

Micropro International Corp. announced profits for the third quarter ended May 31 of $620,000, or 5 cents per share, compared with year-earlier profits of $2 million, or 17 cents per share. Revenues were $15.6 million, compared with $12.2 million in the third quarter of 1983.

Ex-prisoner to advise franchise on China market

OAKLAND, Calif. — After spending 17 years in solitary confinement in a Chinese jail, the thought of being a computer industry consultant was the last thing on Sidney Rittenberg's mind.

Yet that is exactly the position that the resilient 62-year-old Rittenberg now finds himself in, having been hired as special advisor on China to Computerland Corp., the fast-growing computer store franchiser.

Rittenberg's story is one of extremes. After studying Chinese at Stanford University in California, the young man from Charleston, S.C., first set foot in China in 1945 as an investigator for the U.S. Army Judge Advocate's office.

His fluency with the Chinese language allowed him to move in the highest Communist Party circles, where he knew Chairman Mao Tse-tung and former Premier Chou En-lai personally.

In 1949, Rittenberg was imprisoned for six years on charges of being an American spy. Though he was released in 1955 after the Chinese admitted they had made a mistake, Rittenberg was again charged with spying in 1968, in the wake of the upheaval caused by the Cultural Revolution. This time, he was to spend 11 years in solitary confinement before again being released and exonerated of all charges against him.

Despite these major personal setbacks, Rittenberg continues to spend much of his time in China, and he views his Computerland assignment with unabashed enthusiasm.

"We are in a period when there is a big opening for American computer enterprises in China. To the extent that we are able to take advantage of this, the door is wide open for joint development projects with the Chinese in areas such as software, computer accessories and microcomputer systems," he said in a recent interview here.

The Chinese, Rittenberg explained, view computer technology as vital to their program of economic reform. In particular, computers are seen as the key to modernizing China's antiquated and very labor-intensive management system.

Some of the areas where computers are used to transform traditional working methods, Rittenberg added, include the massive number of personnel files that permeate every Chinese organization, customer interface, accounting systems and hotel and hospital management systems. The Chinese are also experimenting with local-area networks in their factories in an attempt to improve quality control, he added.

While the Chinese have gone into computer assembly in a big way, they do not yet have the capacity to manufacture their own machines, Rittenberg noted.

"The big block in China's computing capability at the moment is chip technology, because the yield rate is very low, and it doesn't allow them to build really powerful systems. As a result, there is a terrific future for overseas companies that supply microcomputer and minicomputer technology," Rittenberg asserted.

Following the signing of a letter of intent to set up a joint venture between Computerland and the Chinese Ministry of the Electronics Industry, Rittenberg and his colleagues plan to take 12 or more state-of-the-art micro systems to China this summer for viewing by the Chinese data processing community.

Products being shipped include offerings from Hewlett-Packard Co.; Texas Instruments, Inc.; Compaq Computer Corp.; Televideo Systems, Inc.; Eagle Computer, Inc.; and possibly IBM.

Rittenberg sees his newfound profession as a way to fulfill his vision of bringing the U.S. and China closer together. "For 40 years I have been obsessed with the enormous potential for cooperation between the two countries. Computers are a way of building that bridge of cooperation."

Rittenberg chats with Mao Tse-tung, the late Chinese premier

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COMPUTER INDUSTRY

EXECUTIVE CORNER

Bryan R. Roub has been appointed to senior vice-president, finance, at Harris Corp.

■

The board of directors of the Monchik-Weber Corp., a computer software and services firm specializing in financial information systems, has announced the promotion of **Joseph Scarola** and **John Staples** to the positions of vice-president.

Donald R. Gibbs has resigned as executive vice-president and chief operating officer. Mr. Gibbs had been in the position since March 1983 and was chief financial officer for seven years before that. His position has not yet been filled.

■

George H. Gilmore, senior consultant at McKinsey & Co. of Toronto, has been hired for a new position of vice-president in charge of worldwide strategic operations planning and management at Mitel Corp.

Three assistant vice-presidents have been promoted to vice-president: **Ronald A. Evans,** in large systems products; **Lester N. Kirkland,** engineering, small systems and peripherals; and **Gino Totti,** engineering, large systems, at Mitel.

■

Media Technolgy has made the following promotions: **Shirish Desai,** vice-president, engineering; **Lee Birch,** director, manufacturing; **Len Marsh,** director, finance.

■

Al Stevens has been named vice-president, manufacturing, at Interlan, Inc.

■

Rod North has been promoted to vice-president of manufacturing at Applied Microsystems, Inc.

■

James S. Hunter has been named vice-president of corporate development at Network Research Corp.

■

J. Douglas Bailey has been named vice-president, market planning, for National Advanced Systems, Inc.

■

John Schwan has been appointed to vice-president of special products for California Computer Products, Inc.

■

Eric T. Ringkjob has been appointed president and chief operating officer of Intecom, Inc. **James Hillgren** has been named vice-president of human resources. Hillgren is responsible for organizational planning, personnel and corporate training.

■

Gerard E. Battista Jr. has been appointed managing partner of the MIS/DP group at Leahy & Co.

■

William A. Aylesworth has been named principal financial officer of Texas Instruments, Inc., succeeding James L. Fischer, who is retiring for personal reasons.

Mr. Aylesworth, who has been vice-president and treasurer, will continue in those positions.

■

Melvin E. Barlow and **Asaph H. Hall** have been named to new positions at General Dynamics Corp. Barlow, formerly vice-president and general manager of the data systems division, has been appointed vice-president and general manager of the electronics division, San Diego. Hall, who has served as staff vice-president, corporate planning, since 1978, will succeed Barlow as vice-president and general manager of the data systems division, St. Louis.

■

Alan W. Crites has been appointed vice-president and manager, strategic planning and operations integration, for General Electric Information Services Co.

■

David P. Goselin has been appointed vice-president of operations at Gould, Inc.'s programmable control division.

■

Thomas M. Hoger has been appointed vice-president, manufacturing systems, at Martin Marietta Data Systems, Inc.'s U.S. operations.

■

Wayne Benoit has been promoted to vice-president, product planning and development, at Linkware Corp. **Vincent D. Conway** has been promoted to vice-president, finance.

■

Steve Mitchell has been appointed manager of the Atlanta office of Falcon Systems, Inc., a federal distribution channel for Apple Computer, Inc. computer products.

■

Joseph W. Farrelly has been appointed director of software development for Applied Data Research, Inc.

■

Ronald D. Fisher has been named president and chief operating officer at Interactive Systems Corp. Fisher was formerly employed by Visicorp of San Jose, Calif.

■

Robert Huberfeld, formerly director of federal government operations for Datapoint Corp., has been appointed president and chief operating officer of Intellimac, Inc.

■

Dr. Philip Lavin has been appointed president and chief executive officer at Consulting Statisticians, Inc.

■

Thomas J. Popek has been promoted to senior vice-president, components division, at Zilog, Inc.

■

John Wagner has been appointed to vice-president, systems development, at Envoy Systems Corp.

■

The following promotions have been announced by Intran Corp: **Art R. Roberts**, executive vice-president and chief financial officer; **Mike Smith**, vice-president, marketing; **Earnest L. Stonebraker**, vice-president, product integration.

■

Jim Ottinger, president of Forte Data Systems, named **Larry J. Wilburn**, director of operations; **Peter Cheung**, director of engineering; and **Jim Buerkle**, director of sales for the data communications hardware and software manufacturer.

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SUPERSHORTS

Bolt Beranek and Newman, Inc. has announced the formation of a wholly owned subsidiary, **BBN Software Products Corp.** and the appointment of **Ean Rankin** as its president.

■

United Telecommunications, Inc. and **Continental Telecom, Inc.** jointly announced the completion of an agreement to exchange properties in the Mid-Atlantic region.

The transaction was effective at the close of business June 30. In the transaction, Contel exchanged its 7,000-customer operation in Sussex County, N.J., plus an undisclosed amount of cash, for United's 11,000-customer operation in the Chesapeake, Va., area.

The New Jersey property acquired by United will be operated by United-Sussex Telephone Co., Inc., and will be a part of the United Telephone System-Eastern Group, which is headquartered in Carlisle, Pa. The Chesapeake, Va., property will now become part of Continental Telephone Co. of Va., headquartered in Mechanicsville, Va.

■

Ultimate Computer Services (UCS) has announced it will sell used micro computing equipment through its micro products marketing division. Types of equipment to be sold by the division include microcomputers, CRT displays, printers and modems. This equipment comes largely from UCS customers in the course of upgrading their own systems.

■

Barrister Information Systems Corp., has announced the formation of its Canadian subsidiary, **Barrister Information Systems Ltd.** Barrister Information Systems received approval from the Foreign Investment Review Agency of Canada in January to provide marketing, consulting, training and maintenance for Barrister law office management systems to clients located in the province of Ontario.

■

DM Data, Inc. announced the formation of a wholly owned subsidiary, **Fountain Hills Software, Inc.**, to provide additional client services in the area of artificial intelligence software.

■

Lattice Semiconductor Corp. and **Synertek, Inc.** signed a long-term agreement to cross-license and second-source products designed by their respective companies.

The agreement provides Lattice with a portion of the production capacity from Synertek's wafer fabrication facility at Santa Cruz, Calif., in exchange for a license to manufacture Lattice's high-performance 64K-byte static random-access memory design as well as the process technology to produce it. The two companies also agreed to cross-license and second-source future products.

■

RB Robot Corp., of Golden, Colo., announced that the company has reached an agreement in principal with **Robotics International Corp.** of Jackson, Mich., to form a limited partnership for the development and marketing of an obstacle-avoidance sensor system for personal robots. Michigan Robotics, also of Jackson, Mich., will be the general partner for this project.

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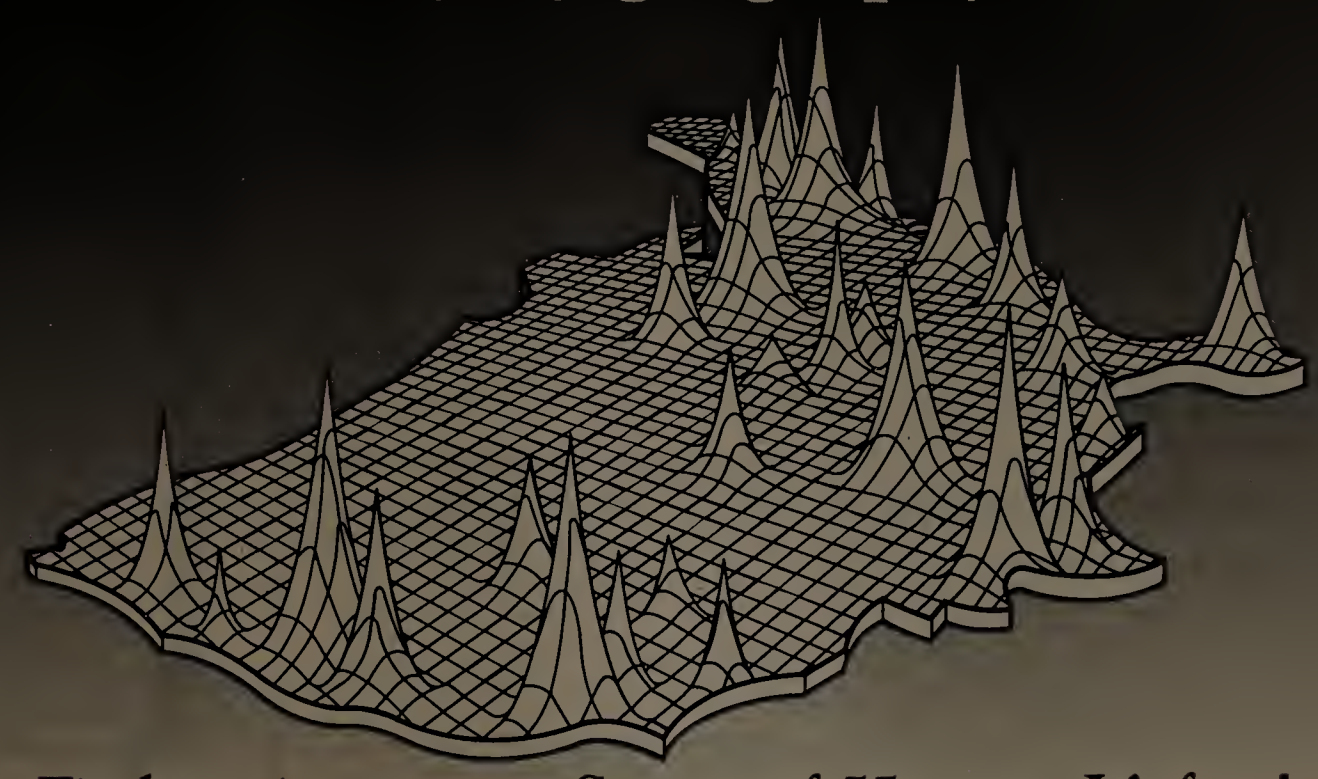

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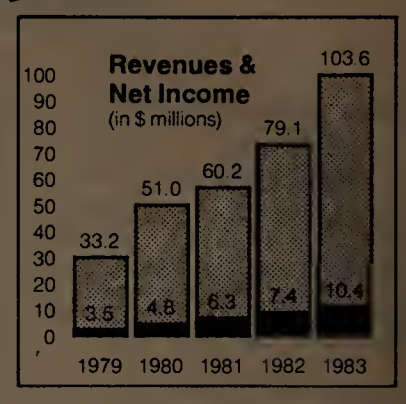

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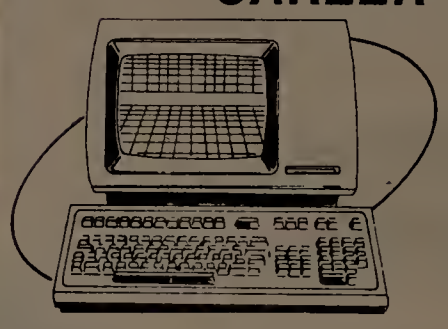

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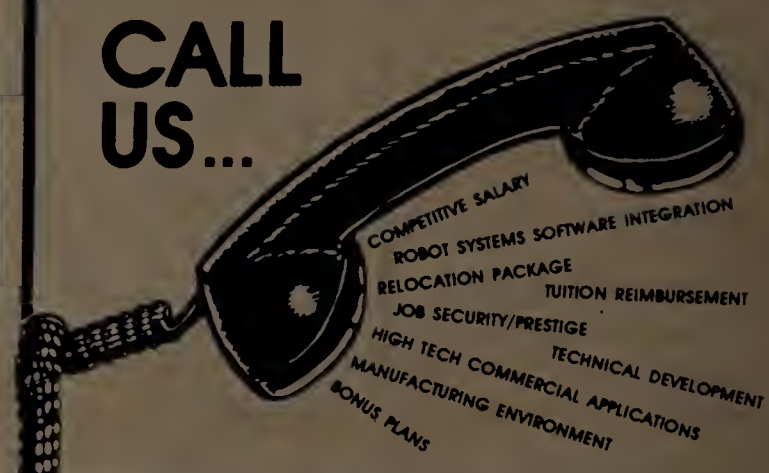

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DOS/VSE & VM/370

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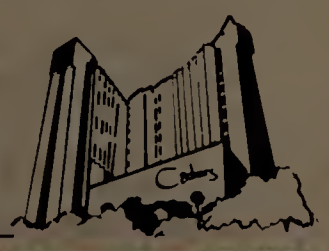

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THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

The best is yet to come... and we'll show you how to get it!

Career advancement depends to a great extent on having a maximum number of career opportunities from which to select the most promising. No one can show you more than National Computer Associates... and no one can match the skillful services of our consultants in helping you get what you want.

Come in. Call. Or mail your resume to the firm nearest to you. Company clients assume our fees.

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3475 Lenox Road N E . Suite 490-C
Live Oak Center
Atlanta, Georgia 30326 (404) 231-4545
BOSTON: Robert Kleven and Co . Inc
North Brook Park, Suite One, 181 Bedford Street
Lexington, Massachusetts 02173 (617) 861-1020
CHICAGO: Thos Hirtz & Associates
150 N Wacker Drive, Suite 1700
Chicago, Illinois 60606 (312) 977-1555
COLUMBUS: Michael Thomas, Inc
65 E Wilson Bridge Road, Suite 201
Worthington, Ohio 43085 (614) 846-0926
DALLAS: DataPro Personnel Consultants
12720 Hillcrest, Suite 520
Dallas, Texas 75230 (214) 661-8600
DETROIT: Electronic Systems Personnel, Inc
3000 Town Center, Suite 2580
Southfield, Michigan 48075 (313) 353-5580
FLORIDA: Data Sciences Personnel, Inc
P O 8ox 8577
Hollywood, Florida 33024 (305) 434-6112
HARTFORD: Compass, Inc
900 Asylum Avenue
Hartford, Connecticut 06105 (203) 549-4240
HOUSTON: Career Consultants, Inc.
2000 South Post Oak
Houston, Texas 77056 (713) 626-4100
INDIANAPOLIS: Career Consultants
107 N. Pennsylvania, Suite 404
Indianapolis, Indiana 46204 (317) 639-5601
KANSAS CITY: D P Career Associates
6405 Metcalf, Suite 502
Shawnee Mission, Kansas 66202 (913) 236-8288
Call the NCA firm nearest to you for Salary Survey, and Relocation Information.

National Computer Associates

LOS ANGELES: Superior Resources, Inc.
Personnel Service
17141 Ventura Boulevard, Suite 200
Encino, California 91316 (213) 986-4400
MILWAUKEE: EDP Consultants, Inc.
7332 West State Street, Suite 3
Milwaukee, Wisconsin 53213 (414) 475-0077
MINNEAPOLIS: Electronic Systems Personnel
858 Twin City Federal Tower, 121 S. 8th St.
Minneapolis, Minnesota 55402 (612) 338-6714
NEW JERSEY: Systems Search
90 Millburn Avenue
Millburn, New Jersey 07041 (201) 761-4400
NEW YORK: 8otal Associates, Inc
7 Dey Street, Suite 410
New York, New York 10007 (212) 227-7370
NEW YORK UPSTATE:
CFA Associates Personnel, Inc.
2530 James Street
Syracuse, New York 13206 (315) 463-5225
NORTH CARDLINA: DataMasters,
Div of TaskForce, Inc., P.O 8ox 6888
Greensboro, North Carolina 27405
(919) 373-1461
PHILADELPHIA: Systems Personnel, Inc.
115 West State Street
Media, Pennsylvania 19063 (215) 565-8880
PHDENIX: Professional Career Consultants
4725 Scottsdale Road, Suite 209
Scottsdale, Arizona 85251 (602) 274-6666
PITTSBURGH: Mortell, Liguore & D'Brien, Inc.
P.O 8ox 836
Allison Park, Pennsylvania 15101 (412) 487-5153
SAN FRANCISCO: The Computer Resources Group, Inc Agency, 303 Sacramento Street
San Francisco, California 94111 (415) 398-3535
SEATTLE: Houser, Martin, Morris & Associates
1940 116th Avenue N E
8ellevue, Washington 98004 (206) 453-2700
WASHINGTON D.C.: ESP Systems Corporation
914 Lamberton Drive
Silver Spring, Maryland 20902 (301) 649-6171

ADVANCE YOUR CAREER....
AND MOVE SOUTH!

SALARIES FROM $26k to $46k

Major sunbelt banks undergoing massive expansion need qualified EDP professionals with experience in large scale IBM on-line systems, COBOL, bank experience prefered but "not mandatory". Several positions available:

- **Programmer/Analysts**
- **Project Managers**
- **System Analysts**
- **Tech Support**
- **Project Leaders**
- **Telecommunications**
- **Tandem Programmers**

GIVE YOUR CAREER A BOOST - MOVE SOUTH AND ENJOY A NEW CAREER AND A NEW LIFESTYLE. Locations Available include (partial list):

- **ATLANTA**
- **CHARLOTTE**
- **JACKSONVILLE**
- **LITTLE ROCK**
- **NEW ORLEANS**
- **ORLANDO**
- **ROANOKE**
- **WINSTON-SALEM**

All fees including interviewing and relocation are paid by our client companies. Confidence assured.

Send resume to:

Kelly Davidson

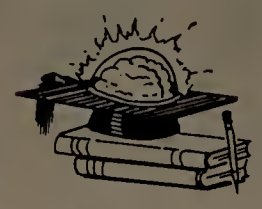
Advanced Recruiters INC.

P.O. Box 19141
Jacksonville, FL 32245-9141

ACP/PARS & BAL PROGRAMMERS

THE GREENBACK KID

Ownership has its own rewards, but there's no getting around the fact that Eastern's compensation package is one of the best in the industry. People who want to get ahead will get there faster with us.



BRAINEE TRAINEE

No one offers as much opportunity to train in state-of-the-art airline software as Eastern. We can provide you with exposure to real-time transaction processing software that can make you among the best in the business.

COMFORT CREATURE

No other company can beat the environment at Eastern's computer center. For people looking for a comfortable work atmosphere with easy access to all the latest equipment, there's no place like Eastern.

THE TRAVEL BUG

Eastern travels to 128 cities in 22 countries and Eastern employee-owners get there at extremely reduced rates. For people who are going places, Eastern makes it easy.

THE WIZARD

Some people just love to work with leading edge hardware and software systems. Others want to work on the newest applications programs. Eastern offers the best of both worlds in one place. "Techies" will love us because "techies" are planning our future.

SUN WORSHIPPER

Beaches. Cabanas. More beaches. Year round comfortable climate. If these words appeal to you, you've probably already visited Miami. Now, you can become a regular.

SHOULD YOU COUNT YOURSELF IN AT EASTERN?

All kinds of people love working at Eastern Airlines for all kinds of reasons. What are yours? Look for yourself here (you may appear several times) and consider this — every Eastern employee is an Eastern owner. Maybe you should experience the pride of ownership.

EASTERN HAS SOMETHING FOR EVERYONE!

But we're only looking for people who have something for us. If you can offer strong analytical skills and a lot of energy, look for yourself in the positions below:

ACP/PARS PROGRAMMERS

We're looking for software development experience using airline control language for transaction processing systems.

BAL PROGRAMMERS

We also seek individuals with knowledge of IBM Assembler to be trained in PARS software. These positions offer the opportunity to learn sophisticated software development using transaction processing technology.

Whatever you're looking for — personally or professionally — you'll find it and more at Eastern Airlines. Our expanding real-time transaction processing system features 4 IBM 3033s, 3 IBM 9083s, and a brand new IBM 9081 designed exclusively for the airline industry. In addition to our competitive salary structure and unlimited air travel benefits, Eastern offers an extremely flexible, individually-tailored relocation package.

WRITE TODAY AND COUNT YOURSELF IN!

If you're interested in our idea of Southern hospitality, don't miss this opportunity with Eastern. We have the salaries and benefits, the training and technology, and a perfect climate — both for your career and your lifestyle. If you're counting on a great future, count yourself in at Eastern. Send your resume with salary history to: Marilyn Brooks, Eastern Airlines, Employment Office, Dept. CW 7/23, Miami International Airport, Miami, FL 33148. Eastern is an equal opportunity employer m/f.

EASTERN
We earn our wings every day℠

EXPERIENCE THE PRIDE OF OWNERSHIP

NATIONAL OPENINGS
TECHNICAL WRITERS

MANAGERS
Mgr, Technical Publications to $55K.
SOFTWARE
SYSTEMS - Operating Sys & Language Manuals to $40K.
APPLICATIONS - Appl & "How - To" Manuals to $35K.
HARDWARE
COMMERCIAL - Instal & Maint Manuals (Digital) to $38K.
GOV SYSTEMS - Manuals & Test Procedures to $36K.

Please call MICHAEL DUNN (collect) at 609 424-8600 or send resume to:
The Executive Mews
Ste. G-37, 1930 E. Marlton Pike
Cherry Hill, NJ 08003
All positions are direct career opportunities
Fees paid by client co

Judge

SENIOR ANALYST/PROGRAMMER

Summit National Life Insurance Company, a rapidly growing subsidiary of Cargill, Inc., is seeking a senior Analyst/Programmer for the Akron corporate offices.

Responsibilities of this challenging position include definition, project supervision, and installation of major projects. The position demands expertise in project planning, budgeting and scheduling.

Minimum requirements include:

- 3 Years system analyst experience
- Knowledge of COBOL
- Project leadership experience
- Insurance industry experience

Qualified applicants should forward their resume in confidence to:

SUMMIT NATIONAL LIFE INSURANCE COMPANY
1815 W. Market St.
P.O. Box 5151
Akron, Ohio 44313
EEO/MFH

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TELEPROCESSING SOFTWARE

Citibank (South Dakota), N.A., a subsidiary of Citicorp, is broadening its Mastercard and Visa offerings to include the electronic delivery of a wide range of financial services. To meet our objectives, we are increasing our investment in state-of-the-art computers and communications facilities. A large IBM mainframe data center and nationwide data networks presently serve an expanding customer base.

The environment is fast paced and demanding. Career opportunities are available for:

DIRECTOR, TELEPROCESSING SOFTWARE

A seasoned, technologically up-to-date, software professional, preferably with a degree in a scientific discipline, is required for directing development and implementation of transaction processing and communications software. He/she must be technically versatile with strong leadership abilities and a special talent for dealing with real business and operations issues.

Although CICS and VTAM/NCP are the principal characteristics of the current environment, the individual must possess the ability and interest in exploiting packet switching and satellite communication technologies in a multi-site processing environment, which are becoming increasingly relevant to our business.

SYSTEMS SOFTWARE PROFESSIONALS

With three to ten years experience in an IBM environment with heavy emphasis on CICS and VTAM/NCP for assignments in:

- **Development and implementation**
- **Stress testing**
- **Performance monitoring and tuning**
- **Maintenance and support**

These positions are located in Sioux Falls, South Dakota, a city that was recently rated as one of America's ten best, providing clean air; natural beauty and a low cost of living combined with a diversity of recreational and cultural facilities.

Please send resume and letter of introduction with salary requirements to:

Citibank (South Dakota), N.A.
P.O. Box 6000
Suite 1166-WCW
Sioux Falls, South Dakota 57117

CITIBANK
Citibank (South Dakota), N.A.

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COMPUTER SERVICES: Operations Manager responsible for implementing and repairing computer equipment on campus, including Digital Electronic and telecommunications equipment; assisting in development and implementation of hardware for purpose of data acquisition and analysis; assisting and automating telecommunications on campus; managing computer operations for mainframe and micro-computer environment. An associate degree in Electronic Technology or closely related area is required; an appropriate Bachelors Degree is desirable. A minimum of 5 years of technical experience with the implementation, maintenance, and repair of Digital Electronic, telecommunications, and mainframe computer equipment is required. A thorough knowledge of operation of a mainframe computer system and peripheral equipment is required. Experience with micro-computers and communication protocols is desired. Salary $20,518-$27,951 with excellent fringe benefits. Write for position announcement or submit letter of intent, resume, unofficial transcripts, and 3 current letters of recommendation completed application must be postmarked by August 24, 1984 to: Mr. Wellington Engel, Chairman, Search Committee for Operations Manager, Mansfield University Computer Center, Alumni Hall 134, Mansfield, PA 16933. AA/EOE-Mansfield University actively solicites the application of blacks and other minorities.

ASSISTANT MANAGER GROUP CLAIMS PROGRAMMING

Accountable for the technical design for sections of application systems, including considerations pertaining to the on-line control systems, data base, or telecommunications. Will lead a programming team in the design and implementation of systems. Should have a strong technical background in systems analysis, systems design, programming and testing procedures with on-line methodology. Should have project management training and demonstrated ability for project management. An exposure to PAC II or an equivalent planning tool would be an asset. Must have on-line (CICS) methodology, macro level coding using VSAM, COBOL, PL/1, Assembler and ISAM, ISA claims systems, ISA map generation, and large IBM system environment. Bachelor's BS in engineering, math, computer science. One year experience or 2 years experience programming analyst/systems analyst in the insurance business. Salary $32,780 to $35,780 per year. Send resume: Confederation Life Insurance Company, 280 Interstate North, Atlanta, GA 30348. Attn: John D. Ector.

PROGRAMMER/ANALYST

HARD WORK
HIGH REWARDS

We are looking for a hard working, motivated programmer/analyst with securities or investment background. Knowledge of "C" or PASCAL is helpful.

We want people to grow and become an integral part of our venture backed company. Send resume in confidence to:

KOCH SYSTEMS CORP.
P.O. Box 2510
San Francisco, CA 94126

SYSTEMS ANALYST/DESIGNER

We are a software development firm with over 30 general ledger based installations nationwide. To keep pace with our continued growth in financial software development, we are seeking an individual to join our design team.

You will be involved in the high level design of accounts receivable and other new accounting systems to be integrated with our existing systems. A minimum of two years experience in programming or designing large scale financial systems is required.

We offer a challenging atmosphere and excellent advancement opportunities for the right individual. Please submit your resume, including salary history and requirements to:

Mitchell Humphrey & Co.

Mitchell Humphrey & Co.
2029 Woodland Parkway
St. Louis, Missouri 63146
Attn: Ed McLaughlin
(314) 991-2440

Agency response will not be acknowledged.

SOFTWARE MANAGER

The Medical Center of Central Georgia seeks a Software Manager to be responsible for evaluation, planning, installation, modification, optimization and maintenance of systems software, complex software systems including Technicon Data System's Patient Care System and software packages operating on an IBM 4341 under/with DOS/VSE, POWER, CICS, ICCF. Excellent technical, supervisory, and communications skills necessary. The candidate will manage a working team of three professional staff members. Send resume to Personnel Department, Medical Center of Central Georgia, P.O. Box 6000, Macon, Georgia 31208.

Affirmative Action/EOE

SYSTEMS ANALYST- Design, analyze & implement computer systems. Maintenance & enhancement of these systems. 2 yrs exp. or 2 yrs. related exp.-programming. Bach.-Computer Science. Must have knowledge of COBOL, CICS, PL/I, & FORTRAN. Hardware- IBM 3081, 3031, 370 & IBM PC. $30,000/yr to work 40 hrs. 5 days/wk. Please send resume to: CW-B4038, Computerworld, Box 880, Framingham, MA 01701

EDP MANAGER

Planned growth and expansion has created an exciting opportunity with a leading air freight company in Nassau County. This position requires solid management skills coupled with the ablility to formulate and implement the special project requirements of top management on our IBM System 38. Prior exposure to interactive on-line processing and communications is preferred. We offer an excellent compensation package in a stimulating, results-oriented environment. Please send resume with salary requirements to: P.O. Box 5015, Dept RK-1, New Hyde Park, NY 11042.

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UNIX*

National Registry of UNIX* job openings & professionals

P.O. Box 19949, Dept. CWU
Houston, TX 77224
Please send resume.

Scientific Placement, Inc.
800-231-5920
UNIX is a registered trademark of AT&T

Marketing Manager Software

Weekly Reader Family Software, a division of Xerox Education Publications, a leading publisher of educational and entertainment products, and a member of the Xerox Information Resources Group, has an immediate opening for a Software Marketing Manager.

Your responsibilities will encompass the development and planning of space advertising, direct mail and telemarketing campaigns directed to computer software dealers and consumers. You will also promote XEP software in distributor publications, supervise PR activities and coordinate participation in computer software shows and exhibits.

If selected, you will have prior experience in product planning, demonstrated analytical skills and strong interpersonal ability. Previous software marketing experience is a plus.

We offer an excellent salary and benefits package, and the opportunity to grow with a dynamic unit of Xerox Corporation. Qualified candidates should submit resumes (no phone calls, please) to: **Robert J. Marek, Xerox Education Publications, 245 Long Hill Road, Middletown, CT 06457.** Xerox is an affirmative action employer.

XEROX

MANUFACTURING SPECIALIST

MCBA is an established expanding author/wholesaler of among other things Mfg software for small to medium sized Mfrs. We have an immediate opening for a Mfg Specialist with 8 plus yrs experience in job shops or repetitive Mfg preferably with I/M, scheduling, MRP background. This is an exciting opportunity for an aggressive professional who has Mfg DP experience to consult and support our busy sales department. Job involves lots of short term travel mostly to customer sites. Excellent salary, good location. Send resume and salary requirements to:

Personnel Manager
MCBA
2441 Honolulu Avenue
Montrose, CA 91020
(213) 957-2900

PROGRAMMER/ANALYST

M.I.S. Department is seeking to fill a new position supporting application systems which affect all aspects of a manufacturing operation. We require an experienced person capable of design, development, and maintenance work in our environment, and would prefer a 4-year Computer Science degree or equivalent. We are running an IBM 4341 with DOS/VSE, CICS, and DL/1, and use primarily COBOL.

We are located in North Central Ohio, are a division of a large international corporation, and have excellent benefits. If qualified and interested, send resume to:

Personnel Department
The Rexroth Corporation
P.O. Box 394
Wooster, Ohio 44691

Equal Opportunity Employer

HIRING?

More computer people read Computerworld than any other newspaper in the United States - more than half a million computer people every week.

And, among our 529,650 readers at user organizations about half claim to look at recruitment ads at least every other week (only a small percentage say they never look at recruitment ads).

No wonder Computerworld carries more recruitment ads for computer people than any other publication.

To place your ad or to get a rate card with complete details on Computerworld Classifieds, call or write:

Classified Advertising

Box 880
Framingham, MA 01701
617-879-0700

Technical Marketing Support Specialists

Join a company that combines start-up opportunity with rock-solid stability...

Harris can make it happen

Harris, Florida's largest industrial employer, is a Fortune 200 corporation with sales of $1.8 billion. Our Computer Systems Division is a leading manufacturer of super-mini computers. Due to expanded growth, the following exceptional opportunities are available.

CAD/CAM SPECIALISTS

You will work in a stimulating professional environment, identifying and assimilating third-party software packaging into Harris product lines. Your responsibilities will include visiting vendor sites to evaluate software packages, as well as working with field sales support and sales personnel to implement customer systems. You should have a degree in Computer Science, Electrical Engineering, Mechanical Engineering or a related technical discipline, as well as applicable industry or user experience. Proficiency in Fortran at the code level is a must. You should also be able to communicate well, verbally and in writing, and possess excellent inter-personal skills.

DATABASE SPECIALISTS

You will participate in the design and have principal responsibility for programming of a national software support dispatch system. You will be working with interactive data entry and retrieval programs, relational database management programs, communications and networking programs and interactive and background management report programs. You should have a BSCS and 2-5 years' related experience. Database design experience is required. Applications program development experience in "C" or Fortran is also required. Additional openings exist for database management specialists with similar qualifications in our applications software support group within the Marketing Department.

These positions offer high visibility, diverse career options and unlimited growth potential. Harris Computer Systems Division also offers a competitive salary/benefits package, a delightful south Florida location, and no state income tax. **To find out more about these outstanding career opportunities, forward your resume including salary history to: Jan Jeter, Harris Computer Systems Division, 2101 W. Cypress Creek Road, Ft. Lauderdale, Florida 33309-1982.**

We are an equal opportunity employer M/F/H/V

HARRIS

IF IT'S HAPPENING IN ELECTRONICS, IT'S HAPPENING AT HARRIS.

VICE PRESIDENT DATA PROCESSING

Consolidated Group, Inc. is a nationally known and respected administrator of group insurance programs for small employers. We have an immediate need for a dynamic executive to lead and direct our Data Processing Division. This challenging opportunity includes the following responsibilities:

— Develop long range data processing strategies.
— Establish an effective organization geared toward analysis as well as design and implementation of business systems between company and clients.
— Formulate budget and maintain cost control.
— Assess data processing resource requirements including software/hardware selection, personnel development and facilities.

This highly motivated candidate should have mainframe conversion and data base management experience. Insurance/financial or service industry background preferred for this exciting opportunity.

Consolidated Group, Inc. is a stimulating, rapidly growing company offering a competitive salary and comprehensive benefit package. Please send resume and salary requirements to Robert A. Carnegie, Vice President of Human Resources.

Local interviews will be arranged and generous relocation package is available.

CONSOLIDATED GROUP, INC.

Pleasant Street Connector, Framingham, MA 01701

An Equal Opportunity Employer M F

Career Opportunities at Carrier

Carrier Corporation, a subsidiary of United Technologies, has excellent opportunities for experienced Data Processing professionals.

8100 Technical Support Analyst

This position is responsible for resolution of 8100 related software and hardware problems, regression testing of new versions of the software, maintaining software currency on all 8100 processors, and testing new 8100 related software/hardware products. Interfacing with Applications Development Analysts/Programmers and 8100 Computing Users will be required. Successful candidate will have a Bachelor's Degree in Computer Science or equivalent work experience, working knowledge of the 8100 hardware and DPPX software products is required. 8100 applications development experience would be beneficial.

Analyst/ Programmers

This position is responsible for: designing, developing, and implementing new application development projects; providing technical data processing expertise in support of existing business systems; developing cost estimates, preparing technical programming specifications and preparing program documentation. Successful candidate should have a Bachelor's Degree in Computer Science or related field. Significant experience in COBOL with IMS and knowledge of on-line systems is beneficial. Strong analytical skills are required. 8100 experience desirable.

We offer an outstanding benefits package including: comprehensive medical, dental and life insurance plans; company contributed savings and investment plan; disability program; pension plan and educational assistance programs. For confidential consideration, please send a resume, indicating job preference, salary history and salary requirements to:

Employment Department
CARRIER CORPORATION
P.O. Box 4800 • Carrier Parkway
Syracuse, NY 13221

We will respond to successful candidates only.

UNITED TECHNOLOGIES CARRIER

We Are An Equal Opportunity Employer

TECH. SUPPORT AND COMMUNICATIONS

Our Search For Excellence Can Make Your Dreams Come True!

We will CROSSTRAIN candidates who know ONE of the following:

- IBM MVS/CICS
- HONEYWELL
- STRATUS

ENJOY excellent compensation & benefits (Medical, Dental, Vision, Life, Tuition, Savings & Investment) with an EXPANDING FORTUNE 500 in a moderate SUNBELT CITY free of STATE/CITY INCOME TAX. Reply with salary history.

C.R. Wexler
SERVICE MERCHANDISE CO.
P.O. Box 24600 (T-CW)
Nashville, TN 37202

EOE M/F/H/V

LOWER COLORADO RIVER AUTHORITY

AUSTIN, TEXAS

Come live in one of the country's fastest growing and most desirable cities on the edge of the Texas Hill country. The Lower Colorado River Authority is expanding it's Management Information Systems IBM shop and has the following positions available immediately:

- **MVS or VM Fortran Programmer**
- **CICS COBOL Programmer/Analyst**
- **IDMS Data Base Administrator**
- **MVS Systems Programmer**
- **VM Systems Programmer**

Send resume and salary requirements to:

Human Resources Department

LOWER COLORADO RIVER AUTHORITY
P.O. Box 220
Austin, Texas 78767

Equal Opportunity Employer M/F

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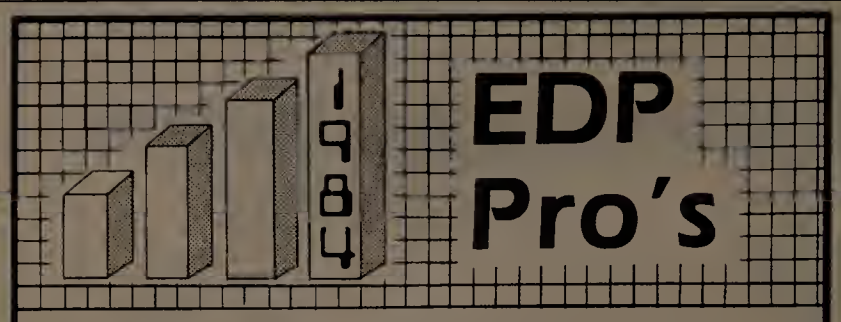

Get in with a company going places.

At AP Telecomputing Corporation, our track record speaks for itself. With a 300% growth rate in 1983 and a projected 200% increase in 1984, the opportunities for career advancement in this totally DP-oriented organization are significant for people looking to stretch their talents.

We have major commitments to the continued development of proprietary software for use in both manufacturing and Cable T.V. markets. We are therefore seeking the right career-minded DP professionals to join our dynamic team.

EDP GENERALISTS: 5-10 years experience with strong management background in IBM technology, COBOL programming and applications development, application installations-evaluation & improvement, development & project enhancements.

PROJECT MANAGERS: 3-5 years heavy experience as Project, Systems or Programming Manager with strong IBM Mainframe exposure.

TECHNICAL WRITERS: 2-3 years minimum, with extensive experience in writing user manuals within software development environment.

TELECOMMUNICATIONS SPECIALISTS: Particularly strong and successful experience in voice networking, SNA/SDLC, VTAM, BTAM, Network Modeling, Packet Switching and Digital Data Services.

HARDWARE SPECIALISTS: Heavy experience in hardware configuration, optimum channel utilization, configurations, controls and IBM performance tuning.

SR. PROGRAMMER ANALYSTS: 5-7+ years heavy experience in applications development with high technical proficiency in COBOL.

PROGRAMMER/PROGRAMMER ANALYSTS: (IBM-PC or Wang-VS) with 3-5 years experience in applications development using COBOL with IBM-PC or Wang-VS (procedure a plus).

SOFTWARE APPLICATIONS INSTALLERS: Software installation experience with medium/small systems (IBM-PC-XT an important plus).

With an ever-growing prestigious roster of clients throughout the U.S., Canada, Europe and South America, we are able to offer excellent salaries and benefits.

To arrange a local interview, please call John DaGrosa or George Swanson, (305) 832-3799 or send your resume with salary history to: AP TELECOMPUTING CORPORATION, P.O. Box 2091, West Palm Beach, FL 33402. Equal Opportunity Employer, m/f.

AP TELECOMPUTING CORPORATION

EMERY WORLDWIDE

Systems Programmers

Challenge your systems expertise with our worldwide computer network.

Emery Worldwide is a leader in the multi-billion-dollar air freight industry. Our computerized accounting operation, located in attractive Scranton, PA, is expanding to meet the needs of our customers. We are looking for two Systems Programmers with a minimum of 5 years experience.

One of these candidates must have a background in VM, DOS/VSE and CICS. The other must have a solid MVS background.

We offer an excellent salary, comprehensive benefits, career growth potential in a stimulating, congenial environment and a generous relocation program. Please send your resume and current salary information in strict confidence to: **Employee Relations Manager, Emery Worldwide, P.O. Box 1959, Scranton, PA 18501.** We are an equal opportunity employer.

EMERY WORLDWIDE

COMPUTER SERVICES: Systems Programmer/Analyst. Duties include assisting with implementation and maintenance of administrative on-line date base systems; providing support to the user community; developing new in-house software systems; evaluating commercially available software systems; assisting with installation and maintenance of systems software. Bachelor's Degree in Computer Science, Infomation Science or related field is required; a graduate degree in Computer Science, Information Science or related field is preferred. A minimum of 3 years experience with programming on-line systems in CICS and COBOL is required; experience in systems programming on IBM mainframe at series 4300 level or higher or larger is required. Experience with DBMS is required; DL/1 experience is preferred. Salary: $21,477-$29,223 with excellent fringe benefits. Write for position announcement or submit letter of intent, resume, unofficial transcripts, and 3 current letters of recommendation completed application must be postmarked by August 24, 1984 to: Mr. Wellington Engel, Chairman, Search Committee for Systems Programmer/Analyst, Mansfield University Computer Center, Alumni Hall 134, Mansfield, PA 16933. AA/EOE-Mansfield University actively solicites the application of blacks and other minorities.

Senior Programmer/Analyst desired by health insurance company. Responsible for maintaining current knowledge of systems design techniques, program languages, coding, and operational requirements. Performs research for new or existing application and interface with users to determine specifications for which programs are written. Design and code program logic as required. Prepares test data, runs systems test and analyze test output. Bachelor's in computer science with 2 years experience as a Programmer/Analyst required. Must have knowledge in debugging techniques, systems analysis, and system design. Must be able to read and code in COBOL, ROSCOE, and JCL. Effective oral and written communication skills necessary. Salary $26,000 per year, 40 hour work week. Contact Texas Employment Commission, Dallas, Texas, Job Order #3650904 or send resume to Texas Employment Commission, Austin, Texas 78778. Ad paid for by an equal opportunity employer.

CONSULTANTS PROGRAMMERS/ PROGRAMMER ANALYSTS

HONEYWELL 6000, IBM 4300, DEC 11/780
OS, GCOS, VAX/VMS
IMS/ADF, IDS, IDMS, DL/1, ADABASE
COBOL, FORTRAN, "C", MARK IV
CICS, NCP, VTAM

Call or send resume to:

DatAssistance, Inc.
10 North Pleasant Street
Taunton, MA 02780
(617) 822-5000

DIRECTOR OF ACADEMIC COMPUTER CENTER

Duties will include directing the computer center as well as managing and maintaining all related functions. Bachelors degree in computer science, business or related field and several years experience required. Several years administrative experience and academic computer experience preferred. Twelve month position available immediately. For more information, contact:

FRANCIS MARION COLLEGE
Personnel Office
P.O. Box F7500
Florence, S.C. 29501
(803) 669-4121, ext 140

An Equal Opportunity Employer

ATTN: IBM TRAINED C.E.'s

HTS needs Customer engineers with IBM training and a minimum of 1 to 3 years experience in the following locations: Chicago, Ft. Wayne, Indiana, and surrounding suburbs. Exceptional compensation, complete benefits package. Send resume and salary requirements to:

Hartford Technical Services
355 Beinoris Drive
Wood Dale, IL 60191
1-800-323-6355

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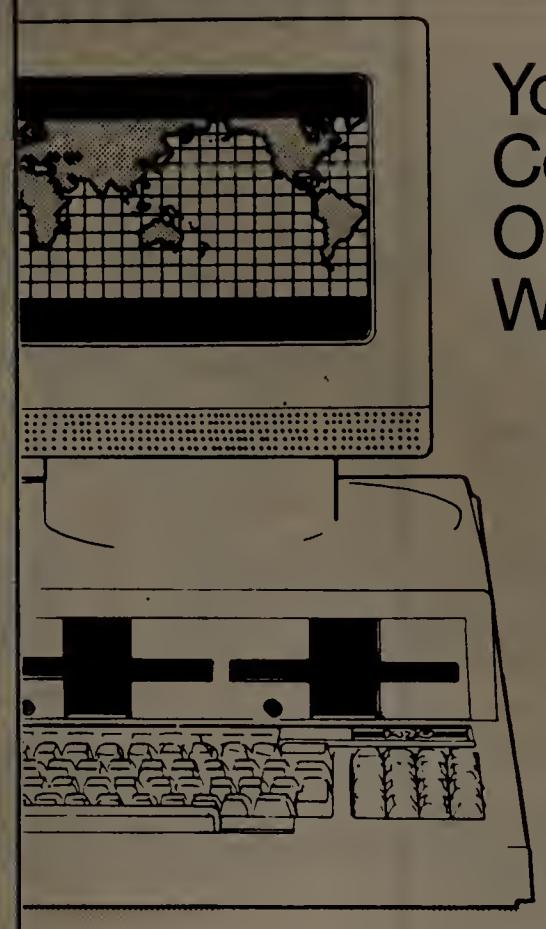

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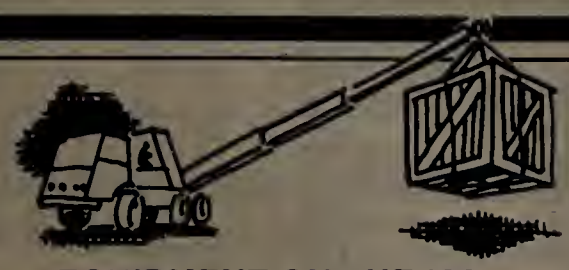

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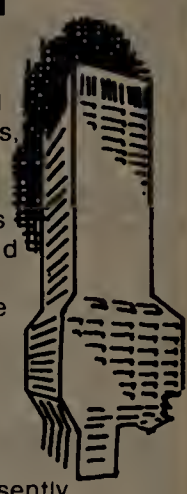

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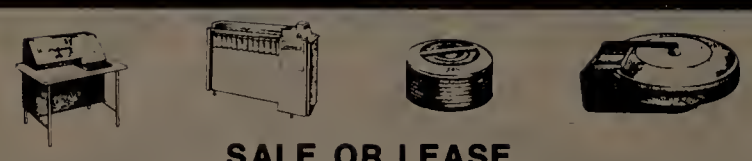

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Bids & Proposals -- Used to request for bids on equipment or to invite proposals for desired computer acquisitions.

The Computerworld Bulletin Board -- This is a low-cost way to buy or sell individual pieces of hardware or software. Sell below for details on sizes and cost.

Here's the data you need to know to place your ad:

The deadline for classified advertising is ten days prior to the issue desired. (That's six working days prior to the issue date). Ads may be sent in by mail. For camera-ready ads, a velox or negative is required. For ads to be typeset by us, enclose a layout if needed, along with any logos or artwork you would like to include in the ad. These must be dark and clear for reproduction purposes.

Our ad takers will be happy to take smaller sized ads over the phone. We can provide simple line borders for you, if desired.

We also provide telecopier service at extensions 410 and 451.

The open line rate is $9.15 per line and there is a minimum size ad of 2 column inches (28 lines) at a cost of $256.20. Column inches are calculated by multiplying the number of columns wide by the number of inches deep that your ad is. Depth increases in half-inch increments and we accomodate up to 5 columns. Column widths are as follows:

1 column -- 1 13/16" or 11 picas
2 columns -- 3 13/16" or 23 picas
3 columns -- 5 13/16" or 35 picas
4 columns -- 7 13/16" or 47 picas
5 columns -- 9 13/16" or 59 picas

If you wish a box number to be assigned to your ad, it will cost an additional $15.00.

First-time advertisers must send either payment or a purchase order along with their ad.

For the ***Computerworld Bulletin Board***, ads may be sent by mail, by telecopier or given over the phone. Space is available in ***one column by one inch deep units*** only. They are set up using a ***simple format with standard typefaces and no borders or logos are allowed***. The cost of one standard unit is $130.00. These units may be combined to form deeper ads.

So, whatever the problem, simply supply us with the data we need to help you on your way to a solution, quickly and efficiently.

If you wish to reserve space, or would like more information, call us at 1-800-343-6474 or (in Mass.) 617-879-0700. All materials should be sent to:

COMPUTERWORLD Classifieds

Box 880, Framingham, MA 01701

The Bulletin Board

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IBM

IBM

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or write to:
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The Bulletin Board

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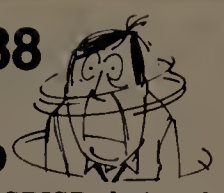

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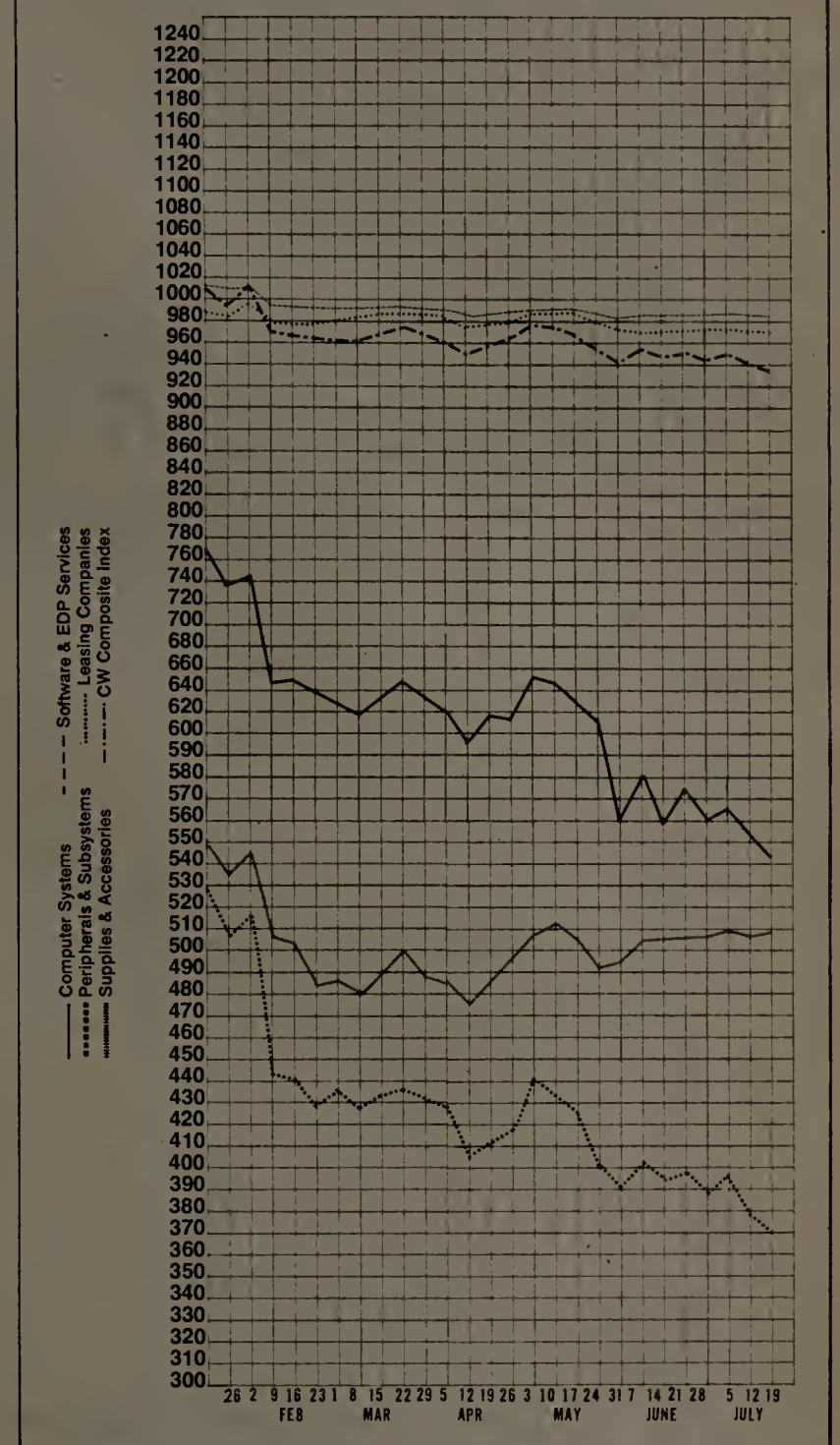

Computerworld Stock Trading Summary

TRADE QUOTES

CLOSING PRICES WEDNESDAY, JULY 18, 1984

All statistics compiled, computed and formatted by TRADE QUOTES, INC. Cambridge Mass 02139

COMPUTER SYSTEMS

EXCH		1983-84 RANGE (1)	CLOSE JUL 18 1984	WEEK NET CHNGE	WEEK PCT CHNGE
O	ALPHA MICROSYSTEMS	11- 24	10 1/2	- 1/2	-4.5
O	ALTOS COMPUTER SYST	8- 21	10 1/4	- 1/8	-1.2
A	AMDAHL CORP	10- 30	10	- 3/4	-6.9
O	APPLE COMPUTER INC	18- 53	25 3/8	-1 1/8	-4.2
N	AT&T	15- 21	17 5/8	+ 3/8	+2.1
N	BURROUGHS CORP	44- 58	53	- 1/4	-0.4
O	COMPUTER AUTOMATION	5- 17	5 3/8	- 1/8	-2.2
A	COMPUTER CONSOLES	14- 28	18 1/2	-1 1/4	-7.0
N	CONTROL DATA CORP	29- 62	28 3/4	- 3/4	-2.5
O	CONVERGENT TECHNOL	10- 41	9 5/8	-1 1/2	-13.4
N	CRAY RESEARCH INC	39- 58	45 7/8	+ 1/2	+1.1
N	DATA GENERAL CORP	27- 49	44 5/8	+ 1/8	+0.2
N	DATAPOINT CORP	17- 31	17 5/8	+ 3/4	+4.4
N	DIGITAL EQUIPMENT	64-125	81 1/8	-1 1/4	-1.5
A	EECO INC	12- 18	13 1/2	- 1/8	-0.9
N	ELECTRONIC ASSOC.	3- 15	3 3/8	+ 1/2	+17.3
N	FLOATING POINT SYST	13- 44	16 1/4	- 1/8	-0.7
N	FOXBORO	29- 47	30	0	0.0
O	GENERAL AUTOMATION	9- 16	8 5/8	-1	-10.3
N	GOULD INC	24- 44	27	0	0.0
N	HARRIS CORP	23- 49	25 1/4	+2 1/8	+8.1
N	HEWLETT-PACKARD CO	31- 48	35	-1 1/8	-3.1
N	HONEYWELL INC	46- 69	48 3/4	+ 1/4	+0.5
N	IBM	103-134	107 1/2	+2 1/4	+2.1
O	IPL SYSTEMS INC	3- 14	3 3/8	+ 1/8	+3.8
N	M/A-COM INC	13- 35	17 3/4	- 1/2	-2.7
N	MANAGEMENT ASSIST	8- 26	25 3/8	+ 1/8	+0.4
N	MATSUSHITA ELEC(ADR)	60- 88	82	-5 1/4	-7.8
N	MODULAR COMPUTER SYS	8- 18	7 5/8	+ 1/4	+3.3
N	MOHAWK DATA SCI	8- 17	12 1/2	- 1/8	-0.9
N	MOTOROLA INC	29- 49	33 7/8	0	0.0
N	NAT'L SEMICONDUCTOR	11- 20	10 3/4	-1 3/8	-11.3
N	NBI INC	17- 38	20 3/8	-1	-4.6
N	NCR	23- 34	22 3/4	+ 1/8	+0.5
N	PERKIN-ELMER	19- 37	18 1/2	-1 1/2	-7.1
N	PRIME COMPUTER INC	11- 26	13 3/8	- 5/8	-4.4
N	SPERRY CORP	38- 50	35 1/2	- 5/8	-1.7
O	TANDEM COMPUTERS INC	18- 40	21 3/8	-1 7/8	-8.0
N	TANDY CORP	25- 82	28	+ 3/8	+1.4
O	TELEVIDEO SYSTEMS	6- 41	5 1/2	- 3/8	-6.3
O	TELXON CORP	8- 16	10 3/4	+ 1/4	+2.3
N	TEXAS INSTRUMENTS	101-169	119 1/4	-3 3/8	-2.7
A	ULTIMATE CORP	15- 24	18 3/8	- 3/8	-1.8
O	VECTOR GRAPHICS INC	1- 8	3/4	0	0.0
A	WANG LABS "B"	24- 42	25	- 5/8	-2.4
A	WANG LABS "C"	24- 42	24 7/8	-I 1/8	-4.3
N	XEROX CORP	35- 52	38 3/4	-1 5/8	-4.2

LEASING COMPANIES

EXCH		1983-84 RANGE (1)	CLOSE JUL 18 1984	WEEK NET CHNGE	WEEK PCT CHNGE
O	BOOTHE FINANCIAL CP	10- 21	19 1/2	- 1/2	-2.5
N	COMDISCO INC	10- 42	10 7/8	- 5/8	-5.4
O	CONTINENTAL INFO SYS	5- 15	5 3/8	- 1/8	-2.2
N	DPF INC	10- 15	11 3/4	0	0.0
O	PHOENIX AMERICAN INC	8- 17	8 3/8	- 1/8	-1.9
O	SELECTERM INC	1I- 21	I3	0	0.0
N	U.S. LEASING	29- 44	30 1/2	- 1/4	-0.8

COMPONENTS

EXCH		1983-84 RANGE (1)	CLOSE JUL 18 1984	WEEK NET CHNGE	WEEK PCT CHNGE
N	ADVANCED MICRO DEV	25- 37	29 1/2	- 3/4	-2.4
O	ADV'D SEMICONDUCTOR	17- 38	17	-I 1/2	-8.1
N	ANALOG DEVICES INC	20- 32	22 3/8	-1 1/8	-4.7
O	ANALOGIC CORP	10- 31	I0 1/4	-1 1/2	-I2.7
N	APPLIED MAGNETICS CP	9- 37	9 1/8	-2	-17.9
N	TERADYNE	24- 39	23 3/4	-1 1/4	-5.0

SOFTWARE & EDP SERVICES

EXCH		1983-84 RANGE (1)	CLOSE JUL 18 1984	WEEK NET CHNGE	WEEK PCT CHNGE
O	ADVANCED COMP TECH	3- 8	3 1/4	- 1/4	-7.1
N	ADVANCED SYSTEMS INC	I4- 22	I5 3/8	+ 1/2	+3.3
O	AGS COMPUTERS INC	12- 32	I2	- 1/2	-4.0
O	AMERICAN SOFTWARE	13- 31	12 3/4	- 1/4	-1.9
N	ANACOMP INC	2- 19	2 1/4	0	0.0
O	ANALYSTS INTL CORP	5- 17	5 1/2	- 1/4	-4.3
A	APPLIED DATA RES.	18- 37	18 1/8	- 5/8	-3.1
O	ASK COMPUTER SYSTEMS	13- 21	16 1/2	- 1/4	-1.4
B	ASTRODYNE COMP IND	1- 7	1 5/8	- 1/8	-7.1
N	AUTOMATIC DATA PROC	30- 44	35 1/2	+ 1/2	+1.4
O	CGA COMPUTER ASSOC	9- 17	11 1/4	- I/4	-2.1
O	COMPUTER ASSOC INT'L	15- 35	17	-1 3/4	-9.3
O	COMPUTER HORIZONS	8- 20	6 1/4	- I/2	-7.4
O	COMPUTER NETWORK	5- 11	5 5/8	+ I/2	+9.7
N	COMPUTER SCIENCES	11- 23	I1 3/4	- I/2	-4.0
O	COMPUTER TASK GROUP	12- I9	14	0	0.0
O	COMPUTER USAGE	6- 18	8 1/2	- 3/4	-8.1
O	COMPUTONE SYSTEMS	4- 23	4 1/8	- 3/8	-8.3
O	COMSERV CORP	2- 16	2 1/8	- 1/4	-10.5
O	COMSHARE	7- 14	7 7/8	- 3/8	-4.5
N	CULLINET SOFTWARE	24- 50	36 5/8	+ 3/8	+1.0
O	CYCARE SYSTEMS INC	16- 25	I8 3/4	- 1/4	-1.2
N	ELECTRONIC DATA SYST	25- 43	43 1/8	+ 1/2	+I.1
O	HOGAN SYSTEM INC	11- 27	10 1/2	- 1/2	-4.5
N	GENERAL ELECTRIC CO	45- 59	49 3/4	- I/4	-0.5
N	GTE CORP	38- 48	37 5/8	+ 3/8	+1.0
N	INFORMATICS INC	15- 32	15 3/8	-5 7/8	-27.6
O	INFORMATION SCIENCE	5- 17	5	0	0.0
O	INFOTRON SYSTEMS CP	25- 43	28	-1 1/4	-4.2
O	KEANE ASSOCIATES	6- 15	9 3/4	0	0.0
A	LOGICON	18- 31	23 7/8	+1	+4.3
O	MCI COMMUNICATIONS	7- 28	6 7/8	- 1/8	-1.7
O	MNOT SCI AMER INC	11- 33	11	0	0.0
O	MATHEMATICAL APP GRP	6- 18	7	+ 1/2	+7.8
O	MICOM SYSTEMS INC	31- 50	31	-4	-11.4
O	MONCHIK-WEBER CP	6- 22	7 3/4	0	0.0
O	NATIONAL DATA CORP	14- 26	15	- 5/8	-4.0
O	ON-LINE SOFTWARE INT	8- 29	9 3/4	+I I/4	+14.7
O	PANSOPHIC SYSTEMS	1I- 30	I3 1/2	- 1/4	-1.8
N	PLANNING RESEARCH	12- 21	13 7/8	- 7/8	-5.9
O	POLICY MGMT SYSTS CP	22- 35	26 1/2	-2 3/8	-8.2
O	PROGRAMMING & SYS	4- 8	4 7/8	+ 3/8	+8.3
O	REYNOLDS & REYNOLD	28- 53	27 1/2	- 1/2	-1.7
O	SEI CORP	13- 34	15 1/4	-1 1/2	-8.9
O	SHARED MEDICAL SYST	23- 43	27 5/8	-1 3/4	-5.9
O	SCIENTIFIC COMPUTERS	8- 14	9	+ 3/4	+9.0
O	SOFTWARE AG	8- 14	10 1/2	- 5/8	-5.8
N	URS CORP	10- 18	10 3/8	+ 1/8	+1.2
N	UCCEL	7- 17	8	- 3/8	-4.4

PERIPHERALS & SUBSYSTEMS

EXCH		1983-84 RANGE (1)	CLOSE JUL 18 1984	WEEK NET CHNGE	WEEK PCT CHNGE
P	AM INTERNATIONAL	2- 7	2 7/8	- 1/8	-4.1
A	ANDERSON JACOBSON	7- 26	9 1/2	+ 3/4	+8.5
O	AUTO-TROL TECHNOLOGY	11- 29	11 3/8	- 1/8	-1.0
O	AVANT-GARDE COMPUTNG	15- 29	18	-1	-5.2
O	BANCTEC INC	7- 22	7 3/4	- I/4	-3.1
A	BEEHIVE INT'L	3- 15	2 5/8	- 1/8	-4.5
N	BOLT,BERANEK & NEW	17- 30	17 7/8	- 7/8	-4.6
O	CAMBEX CORP	I- 3	1 1/8	0	0.0
N	CENTRONICS DATA COMP	10- 28	I0 1/4	- 3/4	-6.8
A	CETEC CORP	7- 12	7 3/4	0	0.0
A	COGNITRONICS	5- 20	4 3/4	- 1/8	-2.5
O	COMPUTER DEVICES INC	0- 0	I/2	0	0.0
O	COMPUTER TRANSCEIVER	2- 10	2	- 1/8	-5.8
N	COMPUTERVISION CORP	29- 53	33 1/4	-4 3/4	-12.5
N	CONRAC CORP	11- 24	13 1/4	+ 1/2	+3.8
A	DATAPRODUCTS CORP	16- 32	17 7/8	+ 1/4	+I.4
A	DATARAM CORP	8- 12	8 3/8	+ I/8	+1.5
O	DATA SWITCH CORP	13- 41	13	+ 1/4	+1.9
O	DATUM INC	8- 17	5 7/8	- I/8	-2.0
O	DECISION DATA COMPUT	9- I5	9 7/8	- 5/8	-5.9
O	DOCUTEL-OLIVETTI	7- 39	8 3/8	0	0.0
N	ELECTRONIC M & M	5- 11	6 I/8	0	0.0
O	ENDATA, INC	9- 16	8 3/4	- 1/8	-1.4
O	EVANS & SUTHERLAND	15- 50	14 3/4	-1 7/8	-11.2
O	GANDALF TECHNOLOGIES	9- 13	10 5/8	- 1/2	-4.4
N	GEN'L DATA COMM IND	10- 17	14 3/8	- 3/4	-4.8
O	GREAT SOUTHWEST IND	1- 3	3/4	+ 1/8	+20.0
N	HAZELTINE CORP	16- 31	25	+ 1/4	+1.0
O	ICOT CORP	3- 8	3 3/4	0	0.0
O	INFORMATION INTL INC	10- 19	10	-1 1/4	-11.1
O	INTEL CORP	28- 45	29	- I/4	-0.8
O	IPL SYSTEMS INC	3- 14	3 3/8	+ 1/8	+3.8
A	LUNOY ELECTRONICS	7- 19	7 1/4	- 1/8	-1.6
O	MEGADATA CORP	8- 15	11 3/4	0	0.0
A	MBI DATA CORP	11- 25	11 1/2	+ 5/8	+5.7
N	NASHUA CORP	19- 29	26 1/4	-1 1/4	-4.5
O	NETWORK SYSTEMS CORP	16- 34	20 3/4	-I 7/8	-8.2
N	NO AMERICAN PHILIPS	30- 40	31	- I/2	-1.5
N	NORTHERN TELECOM LTD	30- 49	33 5/8	- I/2	-1.4
O	OMEX	1- 6	3/8	- 1/8	-25.0
N	PARADYNE CORP	12- 28	12	-I 3/8	-10.2
A	PENRIL CORP	9- 14	12 5/8	+ 1/8	+1.0
O	PHOENIX AMERICAN INC	8- 17	6 3/8	- 1/8	-1.9
N	PLESSEY CO (ADR)	26- 41	26 5/8	- 3/8	-1.3
O	PRINTRONIX INC	16- 34	18	-2 1/2	-13.5
O	RAMTEK CORP	6- 23	7 1/4	0	0.0
N	RECOGNITION EQUIP	10- 17	9 3/4	-I	-9.3
N	ROLM CORP	30- 80	38 3/8	+ 5/8	+1.8
N	SANDERS ASSOCIATES	36-120	40 3/4	- 1/2	-1.2
O	SCAN DATA	1- 3	3/8	0	0.0
O	SCAN-TRON CORP	10- I9	9 7/8	-2 3/8	-19.3
N	SCIENTIFIC ATLANTA	8- 23	7 7/8	- 1/4	-3.0
N	STORAGE TECHNOLOGY	9- 23	8 1/2	- 1/4	-2.8
O	SYKES DATATRONICS	3- 13	2 5/8	- 1/4	-8.8
O	SYSTEMS & COMP TECH	20- 39	24 3/4	0	0.0
A	T BAR INC	7- I7	8 7/8	- I/2	-5.3
A	TAB PRODUCTS CO	13- 20	15 1/8	+1 1/8	+8.0
O	TANDON CORP	7- 35	7 5/8	+ 5/8	+8.8
A	TEC INC	6- I2	9 3/4	0	0.0
N	TEKTRONIX INC	54- 87	54 1/8	+ I/8	+0.2
N	TELEX	19- 32	27 5/8	+ I/4	+0.8
O	TESDATA SYSTEMS CP	3- I7	3	- 1/4	-7.8
N	TIMEPLEX INC	13- 23	12 3/4	-1 1/4	-8.8
O	VISUAL TECHNOLOGY	9- 26	9 1/4	0	0.0

SUPPLIES & ACCESSORIES

EXCH		1983-84 RANGE (1)	CLOSE JUL 18 1984	WEEK NET CHNGE	WEEK PCT CHNGE
N	AMERICAN BUS PRODS	17- 23	20 3/4	+ 3/8	+I.8
N	BARRY WRIGHT	22- 33	26 7/8	+ 3/8	+I.4
A	DUPLEX PRODUCTS INC	22- 27	23 3/4	0	0.0
N	ENNIS BUS. FORMS	18- 28	19 5/8	- 1/8	-0.6
N	3M COMPANY	69- 90	75 3/8	-1 1/8	-I.4
N	MOORE CORP LTD	35- 51	38 5/8	- 5/8	-1.5
O	STANDARD REGISTER	27- 35	33 1/4	0	0.0
N	WALLACE COMP SERVICE	23- 33	27 1/8	+1 1/8	+4.3

EXCH: N=NEW YORK; A=AMERICAN; P=PACIFIC; B=BOSTON; L=NATIONAL; M=MIDWEST; O=OVER-THE-COUNTER
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